

Hong Kong Journal of Early Childhood 香港幼兒學報



數碼世代
與
兒童成長

New Technologies and
Young Children



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編者序言

資訊科技的發展和進步，促使人類生活、學習與溝通更簡易方便。智能電話和平板電腦的普及，使教學模式推陳出新，更趨現代化。年幼兒童也輕易地從家庭和學校中，接觸到不同的創新科技，對使用智能電話也絕不陌生。本期主題是「數碼世代與兒童成長」，內容包括多個國家地區的幼兒教育資訊科技的相關應用概況，尤其是使用無線智能電腦於幼教的適切應用。來稿除了有本港學者鄭婉玲、胡馨允及副電子學習策劃經理葉志禧的平板電腦在幼教課程經驗分享外，更有澳洲著名學者Professor Nicola YELLAND 及其研究助理Caja GILBERT的研究比較不同年齡層的幼兒使用平板電腦學習分析，亦有澳洲學者Dr Anna KILDERRY針對平板電腦在幼教應用的利與弊。

此外，英國著名學者Professor Lydia PLOWMAN 及Dr Christine STEPHEN 闡釋家長及幼師怎樣有效地幫助幼兒利用電腦學習。香港學者黎玉貞及梁衛文探討創新科技在特殊教育的應用。台灣學者邱淑惠簡述相關行政及評量的可行應用。香港學者韓重惠分享社交網絡在幼兒機構行政管理的應用。上述文章均配合主題分享創新科技與幼兒的最新研究探討。最後一篇文章並非直接跟本主題相關，但也從經濟角度分析本港資助概況，本港學者陳志威從教育財政視角探討香港幼稚園教育的資助。

祈盼藉此專題讓幼兒教育工作者、研究者及學者對創新科技與幼兒成長有革新的啟示，更促進新時代幼兒的教與學及其生活。

執行編輯

韓重惠、梁衛文



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Editorial

The ubiquitous presence of new technologies in our lives distinguishes them from our previous times and has facilitated learning in new and dynamic ways. In particular, the widespread innovation of smart phones and tablet computers have the potential to modernize the teaching and learning scenarios in education. Young children can easily be exposed to these new technologies in their lives and experience them in home to school context. The theme of this special issue “New Technologies and Young Children” is relevant to transformative education in these new times. The papers that contribute to the edition describe early childhood contexts in both the West and in the Asia Pacific region. The authors are from different backgrounds, and cultures and includes both academics and practitioners in early childhood education. They represent broad and constructive points of views and include discussions on different issues across the theme. Professor Nicola YELLAND and her research assistant Cajo GILBERT have analysed the use and appropriateness of Tablets with four year old children in a preschool setting. Dr Anna KILDERRY argues the pros and cons of Tablet computers for young children in Australia. Professor Lydia PLOWMAN and Dr Christine STEPHEN researched how parents and teachers use computers effectively to help children to learn in United Kingdom. In local context, Ms Elaine CHENG, and Ms Annie HU who are experienced teaching fellows of early childhood education collaborate with Mr Alex IP who is an Assistant e-learning Strategic Manager to demonstrate the integration of Tablet computers into kindergarten curriculum in Hong Kong.

In addition, the manuscripts of this issue are not limited to the relationships between new technologies and young children in mainstream contexts but also consider young children with special needs in Hong Kong. Dr Eva LAI and Dr Vivienne LEUNG whose research interest are special education and ICT in early childhood explored the environment and use of ICT at special child care centre for teaching and learning in Hong Kong. In addition, Dr CHIU Shu Hui from Taiwan, discusses how technologies are used for assessment and administrative purposes in child care centres. Ms Christina HAN who is senior teaching fellow from Hong Kong also considers social network applications that are used for management in early childhood field. The final manuscript by Dr CHAN Chi Wai examines the subsidy system of preprimary education in Hong Kong from the economic point of view.

We hope that this special issue of the journal can provide opportunities for practitioners, researchers and scholars to gain new insights into the relationship between new technologies and young children to promote not only teaching and learning but also give us new insights into the lives of all young children in this new century.

**HAN Chung Wai Christina and
LEUNG Wai Man Vivienne
Edition Editors**



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iPossibilities: Tablets in Early Childhood Contexts

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Abstract

This paper considers the use of tablet technology with young children (aged 4 years of age) in a preschool setting in Australia. The data forms part of a larger project was designed to explore the possibilities of incorporating tablets for learning in three early childhood settings; a mothers' group (2 – 3 year olds), the kindergarten (4 year olds) and in the first year of compulsory schooling (5 and 6 year olds). The research found that there were opportunities for learning that varied across contexts. In the kindergarten tablet play was a stimulus for conversations, a source of collaborations and a location for social encounters. The tablets were successfully integrated into a play-based program, providing opportunities for choice and self-regulation of activities. There was a glimpse of the potential of the tablets to be a resource for reflection, investigations and documentation of lived experiences.

Introduction

In the past 20 years we have witnessed dramatic changes in societies, economies and our everyday lived experiences as a result of the ubiquitous presence of new technologies (Yelland, 2007, 2010). Our personal lives have been transformed with the Internet, social media, and other new forms of communications and devices that enable us to stay connected to our families and friends in diverse locations. Access to information and people is ubiquitous, easy and available to all those who are fluent in the use of new technologies.

The impact is also apparent in the lives of young children. Marsh, Brooks, Hughes, Ritchie, Roberts and Wright (Marsh et al., 2005) stated that young children (aged from birth to 6 years of age) are “immersed in practices related to popular

culture, media and new technologies from birth” (p.5). This enables them to become adept in operating machines and simultaneously develop a huge array of skills, knowledge and understandings about the world in which they live. Participating in media cultures has affected the ways in which children engage with others and impacts on what they can do, think and feel. Marsh et al. (2005) reported that parents felt that their children, while enjoying new media, still maintained ‘balanced’ lives in which they also participated in activities that did not involve the use of new technologies. In fact, the parents were very positive about the role of new technologies in their children’s lives and thought that they were important to all aspects of their learning. However, Marsh et al. (2005) found that while early childhood practitioners were generally positive about new media, they did

express concern about the perceived total amounts of time that children spend on these activities. This is interesting, as there seems to be no data to support the notion that time spent with new technologies detracts from engaging in 'traditional' play activities. The practitioners who participated in Marsh et al. (2005) study also indicated that they wanted more professional learning opportunities to assist them to know more about how to incorporate new technologies into their planning. They had noted that when technology was used in their settings the children were more engaged and that they made good progress in speaking, listening and literacy.

Most of the research to date about young children and new technologies has been done in settings with computers and to a lesser extent with other devices such as whiteboards and digital cameras. Research about the use of tablet technologies in education is relatively new. The introduction of the Apple iPad occurred in April 2010. Prior to this, touch technology really came into being with the introduction of the iPhone and iTouch in 2007. These devices and their associated applications (Apps) made playing with technologies mobile, and created a new phenomenon called 'the pass back effect' (Chiong & Schuler, 2010) defined as when a parent or adult passes their own mobile device to a child, usually for entertainment, for short (15 minute) sessions.

Of the studies conducted with, and about young children and tablets, most are related to the *use* of iPods, iTouch and iPads. While many of these describe practitioner based 'pockets of innovation' (e.g. Clayton-Brown, 2012; DEECD, 2010; Mullholland, 2011) they tend to be professional commentaries or usability studies on the impact of the new technologies in school or in relation to how they have changed the lives of contemporary young children (e.g. Gliksman, 2011; Worthen, 2012). There are very few empirical investigations about the impact of touch technologies for teaching and learning, either in preschool or in school contexts. Rather, they advocate 'tips' for successful use of iPads (e.g. DEECD, 2011) based on their observations and implementations as teachers or consultants.

The majority of studies conducted since 2008 have been commissioned reports that acted as preliminary investigations of the potential of the technology in formal learning environments. For example, in the US, The *Joan Ganz Cooney Centre* at the *Sesame Workshop* have sponsored investigations regarding the classification of Apps (Schuler, 2012), conducted studies of young children's learning with Apps (Chiong & Shuler, 2010), and initiated a blueprint for teaching young children in the digital age (Barron, Clayton-Hodges, Bofferding, Copple, Darling-Hammond & Levine, 2011). Also in the US, the Department of Education funded a study of young children, iPads and their Apps as part of their *Ready to Learn program* (Cohen, 2011). These studies have mainly considered classifying Apps so that a more comprehensive consideration of their learning potential could be realized.

In Australia, Education Departments such as those in Victoria (e.g. DEECD, 2010) and New South Wales (e.g. DEC, 2012) have been involved in iPad 'trials' and have described implementations in which children in the compulsory years of schooling have been using iPads as part of their daily activities. As yet, the results of systematic empirical studies with iPads are not available. It is apparent that early childhood teachers regard the technology as useful (Olney, Herrington & Verenikina, 2008) because they enable young children to engage with digital content, but there still seems to be a general reluctance to dismiss new technologies as not being an integral part of early childhood curricula and pedagogical repertoires.

Yelland (1999, 2007, 2010) has suggested that an effective pedagogy utilising new technologies can be encapsulated in the notion of *playful explorations*. In playful explorations, not only are new technologies part of a repertoire of experiences for young children's learning but also, the teacher is to scaffold this learning so that it is articulated and represented by the children in a variety of modes. In this way, playful explorations provide evidence of children's multimodal learning and encourage the use of a variety of media and resources that are part of this learning as well as being artefacts

of the learning process. This requires a rethinking of the literacy that is required as a basic skill to a new conceptualization of multiliteracies that are fundamental to social and personal futures for all citizens.

Research Design

The data reported here forms part of a larger study that sought to gather information about the ways in which tablet technologies might be supportive of learning in three early childhood settings; a mothers' group (2 & 3 year olds); a (4 year old) kindergarten; and the first year of compulsory schooling (Preparatory year, 5 – 6 year olds). A goal of the project was to explore the ways in which pedagogical actions influenced learning and how the children responded to the tablets as catalysts for their explorations and learning. We were also interested exploring the ways in which the tablets afforded opportunities for multimodal learning (linguistic, visual, spatial oral and aural) in early childhood settings. To this end, we were restricted to using *iPads* as the example of a tablet technology because most of the Apps available for young children are on this platform.

The overall research project involved 95 children (10 in the mothers' group; 20 in kindergarten; 65 in (3 team teaching) Prep classes). As researchers, we wanted to observe and interact with the children and caregivers and teachers, so we adopted a participant observation methodology. Participant observation can be defined as a method in which, 'the researcher is taking part, to some degree, in the activities of the people being observed' (Deacon et al. 1999, p. 251). The aim of participant observation is to gain access to everyday practices, which are difficult to describe or reproduce in group discussion or interview (Mikos cited in Struppert 2011). Through participation in the context, the researcher can achieve a better understanding of the practice, roles and cultural patterns of the participants (Mikos cited in Struppert 2011).

The Context

The kindergarten was located in a suburban

region approximately 15 km from the centre of a large metropolitan city. The group was taught by a teacher with 15 years experience and a four year early childhood teaching qualification and she was supported by a female teacher aide. It had a large outdoor area that facilitated the fluid movement of the children from indoor to outdoor activity. The teacher and aide had not used an iPad prior to this experience.

We observed and interacted with the children in the kindergarten one day a week over a period of 6 weeks, for a half day session. The tablets were introduced and then incorporated into the program as just another activity available for the children. After the observation period we left two tablets in the kindergarten setting for them to use for the rest of the week. An additional goal of the project was to ascertain to what extent the tablets would be used when the researchers were not present. At the end of the term we interviewed the teacher and asked for her reflections on the experience.

Findings

The kindergarten had a play-based program in which the children were able to select an activity from a range of materials that were available, both inside the room and out in the playground. Inside, this included painting materials, a carpet and book area, a puppet theatre and a large range of craft materials and plastic items. Outside there was a sand pit, water play, space to run and various forms of climbing frames. The tablets were available on a table inside, since the children were used to selecting an activity and completing it on a table. As the children became used to having them in the centre they wandered outside to use them. This was a relaxing environment in which to play with the tablets.

Initially, it seemed as if the boys dominated the use of the tablets, but gradually as the girls saw them having fun with them they joined in and asked for their own turn. In the first two sessions in particular, the tablet was the source of meeting for a group of four boys. They would generally watch each other play a game and then ask for a turn. Many of them had tablets at home and



mentioned that they played with specific games like *Cut the rope* and *Where's my water?* These are quite complex games that are enjoyed by adults and children and we had not included them in the repertoire of games available for the 4 year olds. In the first week they made (electronic) cupcakes, played with mice in mazes, explored the puppets of *Play School* and 'flitted' around playing with various games because they had a puzzle that they liked, or a 'cool' game that helped them to make words from letters (e.g. *Super Why!*, *Number Train*). They also enjoyed *Brushes* (painting), completing animal puzzles and playing with a range of counting and literacy based word recognition games.

All activities in this play-based kindergarten program afford opportunities for children to select what they want to do and interact with others in conversation or in collaborative projects (i.e. build a garage with blocks). Having a tablet as part of this represents another activity in which children are able to play and explore and create a variety of contexts for learning about things, people and ideas. The patterns of play were remarkably similar over the different activities. Some encouraged solitary play (e.g. reading, threading) while others were more creative or open ended (e.g. painting and model making with boxes) or physical (e.g. climbing frames, sand and water play). The tablets could be used both inside and outside and thus enabled solitary and group play but also provided contexts for the children, and the children with an adult to discuss what they were doing and to make predictions about what might happen next, as well as seeking information on the Internet.

The observations revealed that when using the Apps some patterns emerged:

- *Solitary play* occurred frequently around games that had specific objectives (e.g. completing a puzzle, making a word, counting).

Observation: When it was Randall's turn he selected the *Angelina Ballerina App*. In the

App, Angelina ballerina thinks of a flower (e.g. A daisy). The player is supposed to use their finger to only pop the bubbles that appear on the screen containing the daisy. The flower that Angelina thinks of changes and the rate of change is controlled by the success of the player. As they improve the bubbles appear at a faster rate.

Note: None of the other kids surrounded Randall while he was playing, so he was able to sit and play on his own for approximately half an hour. When the game started Randall began popping all of the bubbles falling from the sky. I told him that for this game he was only meant to pop the bubbles containing the flower that Angelina was thinking about. He immediately understood this direction and began popping only the correct bubbles. After one game he left the App (using the home button) and selected the *Counting Train* (the user has to select the correct number – out of 3 options – to put on the number train). He was able to drag the correct number from the bottom of the screen and place it in the correct position on the number train (e.g. he moved the number 4 in between numbers 3 and 5). He was very pleased when he got the right answer: "I got it right!" he said excitedly and smiled when the App congratulated him. After playing this app for a while (approx. 2 – 3 minutes) he exited by pushing the home button and selected to play *Tally Tots*. In this counting game the player selects a number from 1 to 20 and then counts to that number as well as completing a task such as putting 10 acorns in a squirrel's mouth. He started at the #2 and continued to touch the numbers in order and complete each number task until he reached #10. After he completed a number activity seemed very pleased with his own efforts – exclaiming 'I did it!' excitedly. After completing the activity for #10 he jumped straight to #20 and completed that activity. At the end of the #20 activity fireflies create the #20 and Rory exclaimed - "I made the number"! He then counted down from 20 to 16.

- The tablet activities become *conversation spots* just like other activities:

While some children were playing with the tablet, others watching would chat to me and more would stroll over from another activity station - simply to chat or show me something marvelous that they'd done. For example, Iris made connection from the *Cupcake Maker* App and told me that she cooked with her Mummy on the weekend and made cupcakes, just as Rose was doing with the *Cupcake Maker*; Randall showed me a drawing he had done while Lucy was creating and tablet sketch; Jane showed me a book she was reading and also shared what she was eating for lunch; Rose and Iris told me about the cubby houses that they had created outside. This form of interaction is useful to stimulate connections in the children's minds as well as provide a catalyst for language use and extension.

The 4 year olds were *adventurous and persistent*, they were able to *share usage* of the tablets and demonstrated the capacity to *self-regulate* their use.

Students at the tablet table when Iris started playing: Rose, Randall, Paul, Iris (playing). Venus and Adam were standing and sitting around her watching and offering advice on what colors she should choose and what buttons she should push...The timer was timing... Iris playing... but she just gave Rose the tablet soon after she had switched to the *Angry Birds* App, before the timer expired.

Rose had a lot of kids crowded around her while she was playing *Cupcake Maker*. A few were trying to touch the screen, which she didn't like. She said "Don't touch... its my turn!"

Will suggested she should choose green icing: "green, green, green ... [he chanted]. Rose chose light pink. Will says despairingly, "Ohhhhhh I miss green".

Venus advised Rose that the sweets that she was selecting for the top of her cupcake were

not healthy: "Lollies not good for you because you get sick". After she said this, Iris started a conversation about how bad lollies are for you and your teeth... When it was time for Rose to hand the tablet over to Randall she did so, but stayed and watched him and joined in a new conversation...

It was also apparent that this group of children were quite *fluent with the foundational skills* that are relevant to the first year of schooling, for example, the positional and relational terms, beginning processes and counting and recognition of numerals. This assisted their playing of many of the Apps that were available on the market.

At the start of this game (*Fireman Sam*) the user is asked to type their name. Venus was able to spell her entire name correctly and select the tick at the bottom of the keyboard when she was finished... She then went on and selected a game in which she had to put out fires in a wood.

When Elaine started playing (*Super Why! Pig Lickety Letter Hunt*) there were no other kids at the table – Venus left after handing the tablet to Elaine. I was sitting to her right and another teacher was sitting to her left. We were chatting as Elaine was playing with the tablet. Elaine told me that she had never played with a tablet before and her family didn't have one at home. She listened to the instructions given by the pig (e.g. "find the letter L"). She would then correctly select the letter "L" out of three letter options. She then exclaimed to me: "I have an L in my name"! Next was the letter A. She correctly selected this as well and again turned again to say: "I have an A in my name too"! Elaine was able to correctly touch the letter, even when the letter wasn't in her name. She wasn't just guessing either. As her hand moved over the wrong letters it was apparent that she was eliminating them as solutions. She was pleased when she got the right answers and stickers. After spelling a few words she exited the App and chose *Moofy's Pattern* App.



One aspect of the study that warrants further investigation is the capacity of the tablet as a resource for *investigation and exploration* by children in kindergarten. We had some examples of the children wanting to find out information, and since the kindergarten had wireless technology it was possible for them to simply pick up the tablet and sit on the sofa or carpet to search on the Internet, with adult assistance. For example, when a group of boys were playing with *Angry Birds*, one of them suggested that they could find more about the game on the Internet as he had done this at home with his parents. We supported their exploration by finding *Google* in the browser, typing the words in the search box, and then we guided their exploration to find a video (*YouTube*) about the range of activities possible in the various extended *Angry Bird* games, as well as in finding a short clip of various angry birds having fun flying in space. The teacher (Naomi) indicated that she was much more interested in the potential of the tablet for exploration and discovery rather than just using it to play with Apps. She envisioned this to include Internet searches for information such as the time when the children expressed an interest in how a butterfly emerges from a cocoon after discovering one in the playground. She realized that there was the potential to use the tablet to record digital photos and movies that could then be either made into books or movies, and subsequently watched by the whole group to stimulate conversations. She advised:

Naomi's reflective notes:

We were keen to use the tablet to access the Internet to research children's interests and ideas, and have done so on several occasions. For example:

- + *Watching a video clip of a volcano eruption in response to the children's interest in volcanoes and following-up with several science experiments conducted in the sandpit.*
- + *Watching the metamorphosis process of caterpillar to butterfly following the discovery of a cocoon in the outdoor area.*
- + *Researching how to make stop motion animation films and then creating our own.*

+ *Identifying various bugs discovered in the outdoor area using the Museum Victoria Field Guide App.*

Naomi also told us of a scenario that took place one day in which having the tablet made a positive difference to the learning of one boy:

Naomi's reflective notes

Owen arrived at kindergarten today with a plan for a project he wanted to complete. "I really want to make a General Grievous costume today," he told me. Unsure as to who General Grievous was, I asked Owen what he looked like. Owen shared that General Grievous was (a character) from the Clone Wars and that "He has four arms which he uses to hold light sabers." I asked Owen if he could draw a picture of General Grievous for me so I could have a better understanding of what he looked like which would then help with the plan to create the costume. Owen didn't want to draw the picture, and continued to describe the character to me. He had very specific instructions about what he wanted it to look like. I then suggested we use the tablet to Google an image of General Grievous to assist us with the creation of the costume. Owen thought this was a great idea, so we did. Owen was pleased to find an image and we set about creating the costume...

In this instance the tablet was a valuable resource in supporting Owen to achieve his goal/plan. He arrived at kindergarten eager and enthusiastic and to be able to follow his interest through to completion (which took about 2 hours in total) was very rewarding!

The **main findings** regarding the use of tablets with the four year old kindergarten group can be summarized as follows. Each point is illustrated with (written) reflections by the teacher (Naomi):

1. Using the tablets with the selected Apps provided contexts and opportunities for solitary and social play.

The tablets did not isolate children from interacting with their peers, but rather gathered children together. Children were often peer to peer educators, supporting and helping each other to engage with the Apps and navigate their way around the tablets showing each other the volume control, changing screens, going back to home page etc.

2. One of the major benefits of playing with tablet Apps was the way in which they constituted opportunities for conversations both between children and between adults and children.

The tablet connected children through a common interest or focus. When engaged together children enjoyed having conversations about their play. For some children it was a lovely way to build peer interactions.

3. Activity on the tablets was characterized by self-regulation and persistence.

We noticed that when children were engaged with the tablet they displayed intense concentration and focus on the task at hand. Children who often had difficulty sustaining concentration on a specific task, appeared to have no difficulty when engaged with the tablet.

4. Playing with the Apps provided an opportunity to encounter and use foundational skills for learning.

There was lots of exploratory play as children discovered which Apps they liked playing, often revisiting these Apps again in following sessions, consolidating their learning and understanding. This is not dissimilar to children revisiting a theme in imaginative play or building towers with blocks, with each visit they acquire new learning and/or deeper understanding.

And...

I know some parent feedback was that some children's skills had increased since having them here.

5. Children were able to experience multimodal learning.

The tablets provided children with choice as to how they wanted engage in particular learning experiences. A perfect example of this is completing puzzles. Many children enjoyed using the tablet to complete puzzles more so than visiting the 'puzzle table'. Would these children have missed out on developing valuable problem solving and spatial awareness skills if the tablet was not available to engage in these experiences or would they have engaged at the puzzle table anyway if the option to do otherwise was not available? This is one area we would be keen to explore further in future.

6. There is potential to use the tablets for more reflective, creative and investigative learning with this age group.

... I could give the camera to somebody on a day, get them to take photos and then come back and plug it in and everyone could see and they could talk about what is happening. It could be a bit of a reflective journal for the day through a child's eyes – not necessarily mine... if it was the child taking photos and then we sit together and write the journal, its what the child sees as being significant so that would be interesting.

Conclusions

The data from the kindergarten setting indicated that the use of tablets enabled the young children to learn in a variety of ways. For example, there was evidence of the following types of learning that had been outlined by Cohen (2011):

1. *Tacit learning* about how the tablet and the various Apps function
2. *Mastery of content*, especially related to



basic skills and foundational knowledge in mathematics and English.

3. *The generalization of skills* learnt that could be transferred to a different App

This was apparent in a range of Apps that could generally be categorized as being:

1. *Games* to practice skills (literacy and numeracy)
2. *Creative* – painting and making short movie sequences
3. *eBooks*

This paper has documented some of the different uses and learning observed and it was evident that there were some general trends in the learning scenarios. These were:

1. *Productive play*. The children enjoyed the immediacy and the opportunity to experience different *modalities* (aural, oral, visual, spatial and linguistic) in their play.
2. It was possible to document the *learning* of young children and consider the various *pedagogical approaches* that were appropriate.

3. The Apps were a source of *social interactions, conversations and provided opportunities for skill building*.

On the basis of the study it was apparent that:

1. Tablet technologies should be incorporated into play based early childhood learning contexts since they represent an exciting and viable resource for young children to support explorations and learning.
2. The pedagogical repertoires of teachers and carers need to be extended so that they are able to incorporate the potential of new tablet technologies into early learning experiences.
3. The use of tablets should go beyond a narrow focus on concept and skill building to incorporate opportunities for playful explorations, reflections and investigations.
4. The provision of Professional Development and resources about research based activities incorporating tablet technology would assist teachers to promote engagement with ideas and deep learning.

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Guided Interaction: Exploring how Adults can Support Children's Learning with Technology in Preschool Settings

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Abstract

We report research that was initially a response to our observations of the difficulties that three- and four-year-old children in Scottish preschool settings may experience during free play at the computer. In conjunction with preschool educators, we observed and made video recordings of children's encounters with more varied forms of technology. We identified ways in which educators could support children's learning, calling this support guided interaction. Analysis revealed indirect (distal) and direct (proximal) forms of guided interaction. We conclude by commenting on our research into children's learning with technology in their family homes and provide some implications of these findings for consideration by educators.

Introduction

Our interest in children's learning with technology originated when the most common form in preschools was a desktop computer which the children could choose to use during free play periods. Despite their enthusiasm for playing with the computer, the children's encounters with it were brief and often unproductive. They frequently experienced operational difficulties as a result of random clicking and imprecise selection of icons, or they found it difficult to understand navigation because the screen design was not tailored to the needs of young children. Additionally, they could be hampered by their inability to read or respond to on-screen instructions, or when they found the tasks within games too conceptually demanding. The busy preschool educators had to share their attention between children using the computer and those doing other activities and this meant that their

supervision tended to be opportunistic and reactive rather than proactive. Although educators willingly responded when a child asked for help or when the children's behaviour demanded their attention, we noticed that the children were more likely to walk away and turn to other activities than seek help when they encountered difficulties.

Scenarios such as these were the starting point for the research reported here, a summary of findings from a series of research projects funded by the UK's Economic and Social Research Council. As a result of noticing these problems, we aimed to explore how educators could enhance three- and four-year-old children's encounters with technologies. We did this by starting with a period of observation and then inviting preschool educators to become actively involved in the process of thinking about guiding learning in



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contexts where the focus is on child-initiated learning through play.

Most children in preschool education in Scotland are three or four years old, with 96% of four-year-old children in part-time preschool education funded by the government and provided by the public, private, or voluntary sectors. Consistent with national expectations about good practice, children typically spend most of the time in their preschool setting choosing freely from a range of activities provided by the educators to support their social, emotional, physical, aesthetic and cognitive development. Play, alone or with others, is considered to be an important medium for learning but in many settings there is also a brief daily period when children are gathered together for adult-led activities. Practitioners take account of children's current interests and the next steps for learning that they have identified through their observations in the playroom when they plan the activities and resources for each session.

Although some of the research we report predates the introduction of the Curriculum for Excellence, which currently guides practice in Scotland, the broad principles remain the same. Children in the Early Level (from three to six years old) are expected to discover what technologies can do, find out how it can help them to present their ideas, and explore how technologies can be used to communicate through play and structured activities. We refer here to practitioners or educators because not all of the staff in Scottish preschool settings have a teaching qualification.

We have been conducting research in the area of young children, learning and technology for more than a decade (Plowman and Stephen, 2005). In the first part of this article we describe some aspects of learning with technology in preschool settings and summarize the main features of guided interaction. In the second part we consider why it can be helpful for early years educators to understand more about children's encounters with the broader range of technologies found in their family homes.

Technology in Preschool Settings

Although we have encouraged educators to include the growing range of technologies which can be better suited to the needs of young children, such as digital cameras, dance mats, cell phones and toys that simulate real-life resources such as barcode readers or toy laptops, we focus in the first part of the article on screen-based devices. The introduction of laptops and handheld devices such as tablets have brought some advantages to children's learning with technology in terms of their affordances for sharing and mobility, but we have found that many of the same challenges persist: the precise form of the technology may have changed over the last decade but our evaluation of online educational games in a preschool setting, undertaken in 2012, showed that many of the problems that children encountered were the same as those we had identified in 2003.

Parents and practitioners frequently express the belief that children have a greater proficiency with technology than they do, but our analysis of data from eight preschool settings demonstrated that young children need guidance from adults. The sociocultural perspective that informs our research describes how factors such as material resources, the cultural practices of the setting and interactions with adults can shape a child's learning experiences. Within this theoretical framework, the ways in which learning is supported have been conceptualised in a variety of ways, including scaffolding (Wood, Bruner and Ross, 1976), assisted performance (Tharp and Gallimore, 1988) and guided participation (Rogoff et al, 1993). However, none of these concepts refers specifically to learning with and through technology. The mediation of learning by technology makes a difference because it introduces an *operational* dimension to learning. In other words, young children may find it difficult to interact with the content on a screen-based device because they cannot achieve what is required in order to get started or to maintain an activity. This is often a problem of interface design but it can be exacerbated if children do not receive the help from others that they need before they can become independent.



Guided Interaction

We describe this support for learning mediated by technologies as *guided interaction*. Because we wanted our findings to be useful for educators and to make a difference to children's experiences we developed methods that allowed us to explore typical everyday experiences in preschool playrooms. The practitioners decided on the pedagogical strategies involving technology that they wished to explore and, with the research team, they collected evidence as they went about their work. At our regular meetings we shared video recordings and observations made by the researchers in the playroom and discussed emerging findings. More information on this process, described by us as guided enquiry, is available in Stephen and Plowman (2008).

As we listened to the practitioners and analysed 16 hours of video along with practitioner observations and our own field notes it was clear that ensuring that children have the kind of positive encounters with digital media in the preschool playroom that can support learning requires more than face-to-face interactions with adults. In the context of learning about and with technologies in preschool settings guided interaction requires *distal* (indirect) and *proximal* (direct) actions. The analysis enabled us to devise a taxonomy of guided interaction showing examples of different types of support, the different modes in which that support is enacted and the learning with which the support is associated. (The account here is highly condensed; see Plowman & Stephen 2007 for more detail.)

Distal Guided Interaction

Distal guided interaction refers to the technology-related actions and decision-making that support learning but take place at a distance from the children. It includes planning for the whole group and for individuals, selecting and providing appropriate resources, arranging the physical environment of the playroom and deploying staff resources in a way that allows support for productive use of technology. Local practices can shape the form that guided interaction takes in each setting by influencing the accessibility and range

of digital media available in the course of each preschool day and the extent to which technologies are integrated with other playroom activities. But preschool policy at a national or regional level can also influence the likelihood and form of guided interaction and could include staff deployment decisions, prioritising of objectives, and practices such as planning and recording progress. Examples of distal guided interaction can therefore range from something as simple as providing a sand timer to structure turn-taking through to identifying the learning needs of individual children, rather than relying on a limited number of tried and tested technological activities. These manifestations of distal guided interaction can vary considerably according to national policy on technology in the early years and the associated models of funding and resourcing provision and practice.

Proximal Guided Interaction

Proximal guided interaction refers to direct, face-to-face interactions between adults and children when they are jointly engaged in activities with technology. It is important to note that the proximal guided interaction that enhanced children's engagement with screen-based technologies in the playroom was not just mediated through language. Indeed, the absence of talk was particularly striking when children used computers. When on their own, children rarely initiated talk with their peers or adults, either to convey enjoyment or to seek help. When sitting alongside an adult, the focus on the screen inhibited communication as it made eye contact difficult. Supportive interactions tended to be multimodal. As well as talk (or often instead of talk), proximal guided interaction involved gesture, touch, gaze and, sometimes, the emotional support that comes from the proximity of a familiar adult. Examples of how 'to do' guided interaction could range from explicit demonstration of how to use an on-screen paintbrush or eraser, showing a child how to frame a picture in a camera's viewfinder, reading out choices from the screen and helping the child to click on the one they selected or encouraging a child to try something new. Some of these involved spoken language, particularly if they were instructional interactions; others included placing a

hand over the child's while they moved the mouse, or just sitting next to the child while they tried something new.

The following extract from field notes presents a scenario that illustrates some of the features of guided interaction. Over a period of time, we were able to analyze a whole series of events such as this in different locations, with different children and practitioners, and with different technologies so that we could build up a detailed description of guided interaction.

Supporting play at the computer

Margaret [the educator] sat beside Steven at the computer. He was interested in the *Pingu* game but selected 'quit' by mistake. She helped him to get back to Snowball Alley and spoke encouragingly to him as he used the mouse to drag objects into position. Margaret asked Steven to count the number of snowmen and to repeat the numbers. He appeared to be totally absorbed most of the time but occasionally pointed to the screen or turned towards Margaret, looking very pleased. Margaret decided that John, who was hovering nearby, should join Steven. She changed the game to one suitable for two players and showed them how to click and drag. She sat on a small chair alongside the boys in a position where she could see the screen and the children. Once she could see that they had settled into the game she moved away, first telling them where she was going, and then scribbled down a log of the incident and which game they were playing on a sticky note.

This example is taken from *Growing Up With Technology* (Plowman, Stephen and McPake, 2010, chapter 5). Other scenarios in the book include guided interaction at the listening centre and guided interaction when role-playing with a mobile phone.

The Value of Guided Interaction

Learning about the need for guided interaction was a positive learning experience for the preschool practitioners who participated in the research.

Prompted by looking at the support needs of the children, practitioners found that they were learning, too. Spurred on by their increasing confidence in the value of technologies as a learning resource in the playroom they were driven to develop their operational skills and extend their pedagogical knowledge by learning from the experiences of their peers and reflecting on their own practice. As they became more confident users of technologies and expanded the range of devices on offer to include cameras, non-functioning cell phones and smart toys, the learning opportunities created for children also expanded. As children responded positively to these opportunities their encounters became more varied, sustained and productive. As a result, educators became more sure about what the young learners could achieve, creating a virtuous spiral.

It is important to note that the proximal and distal dimensions of guided interaction that we found were necessary to enhance children's encounters with technologies in the playroom were already present in the repertoire of preschool educators. They were familiar with ideas from the work of Vygotsky, such as the way in which working with a more capable other supports children's learning in the Zone of Proximal Development, and with the metaphor of scaffolding that draws attention to the ways in which children's competences can be extended by providing supporting structures. We observed practitioners making sensitive and contingent responses when children were engaged in playroom activities such as baking or completing jigsaw puzzles. However, if the interactions necessary to support children's learning with technology were already present in the practitioner's repertoire, we were puzzled about why these aspects of practice were not more frequently observed when children played with technology.

Barriers to Guided Interaction

As described at greater length in Stephen and Plowman (2008), there were several possible answers to this question of why educators were not transferring their usual practices in other areas of the curriculum to technology. In circumstances

where practitioners have oversight of many simultaneous activities within the playroom and other children need support for activities such as reading a story or riding a bicycle, *making time* for the one-to-one interactions often required by technology can be demanding. It is understandable that practitioners are more likely to focus their attention on the occasions when children using a device actively seek help rather than providing the guided interaction that might ensure that problems did not arise in the first place.

Another factor that restricts guided interaction around screen-based devices lies in the *problems of observing children using technology*. A screen on a desktop, laptop or handheld computer is not readily visible from across the playroom and so does not lend itself to the process of visually scanning a room that practitioners routinely use to monitor play and levels of engagement. Their awareness of actual or emerging problems was therefore limited. This is one of the reasons why expanding the range of resources available beyond those with a screen can be helpful.

When exploration is the favoured mode for learning in playrooms some practitioners' *understanding of their role* may lead them to interpret elements of guided interaction as too 'teacherly'. However, our evidence argues not for a shift to didacticism but for interactions that are sensitive to the context and to individual needs. This interpretation of effective pedagogy does not privilege formal instruction, but recognizes that it has to be child-led and responsive, constantly adjusting to the learner's needs.

Using Technologies at Home: Implications for Preschool Practices

Some of the findings from our subsequent research in family homes (Plowman, Stevenson, Stephen and McPake, 2012) also have implications for playroom practice. By the time they started school at age five, nearly all of the children in our case studies had encountered a range of digital media at home, such as cell phones, interactive television, games consoles, DVD and MP3 players, as well as desktop, notebook and tablet computers.

The devices that children engage with at home may be more sophisticated than those available in the playroom, posing a challenge for preschool providers who have to balance limited budgets with engaging children's interest and extending their learning. Even in low-income households in Scotland, the home provided a richer mix of technologies than many preschool settings as well as providing opportunities for children both to observe and to participate in authentic activities that were more personally meaningful than those on offer in the playroom. At home children can take part in internet shopping, talk to and see distant relatives and access some functions of the mobile phones or games consoles that their parents and older siblings use routinely. Ensuring a similar degree of authenticity and individual motivation in a playroom that has been designed solely for young children and where resources have to withstand heavy use requires not only imaginative practices but a specific commitment on the part of providers and policymakers.

Family context makes a difference to children's experiences with digital media. For instance, parents' views about whether technology is a beneficial or malign influence in the lives of their children influence the experiences with technology that individual children bring with them as they enter preschool (Stephen, Stevenson & Adey, 2013). In Scotland it could not be assumed that there is any relationship between the socio-economic status of their family and children's access to technologies. Families make different technologies available, model their use in different ways and encourage different activities.

Three- and four-year olds require and experience guided interaction as they use technologies at home as well as in preschool settings. Although, like practitioners, parents often talk of children just 'picking up' (Plowman, McPake and Stephen, 2008) how to use the technologies available at home we have observed a range of pedagogic styles within families. Some parents deliberately engage in didactic interactions, while others encourage their child to explore alone, believing that they will learn as they play. These

varied experiences at home mean that children in any one playroom will have different sets of competences and different expectations about how to engage in learning. Targeted guided interaction will be essential if they are to have productive encounters with digital media in preschool.

Supporting Children's Learning with Technology: some Conclusions

Curriculum guidance in the early years emphasizes the importance of supporting children in all aspects of their emotional, social, cognitive and physical development in ways that will enable them to become increasingly independent and eager to progress in their learning. These aspirations are compatible with the examples of playing and learning with technology that we observed at home, but we found that preschool staff tended to focus on what they saw as the overtly educational gains to be made – the acquisition of basic operational skills (such as learning to use a mouse), certain learning dispositions (such as taking turns), and the learning arising from the content (such as basic number games) – rather than children's awareness of the different cultural and work-related uses of technology.

In our research in preschool settings we found examples of technologies such as digital cameras, audio recording and listening devices and toys that simulate domestic appliances being used in playful activities designed to contribute to children's *social and emotional* development. They could be used as props in imaginative play with peers, for instance, or for listening to a story then acting it out with puppets. In circumstances such as these, the technological resources appear to enhance children's engagement and the authenticity of the play activity, making the pretend environment more like that experienced at home and in the community. When resources are carefully introduced they can support children's social and emotional development just as well as other resources.

However, the technologies enlisted to support *cognitive* development in preschool settings are still more likely to involve computer games. These

digital resources are more likely to involve closed questions requiring correct answers or to offer opportunities to practise the application of concepts in ways that parallel more traditional preschool activities. Content may include phonics exercises that require a child to add letters to complete a word or matching, sorting and sequencing games. For some children these activities are more interesting and motivating when they are technologically mediated as feedback is instant and often accompanied by entertaining animations. However, these products do not generally extend cognitive activities such as finding out, problem solving and reflecting on thinking and learning. These typically require the adult mediation of guided interaction we describe here.

Our studies have identified a number of areas for consideration by early years educators that can shape their guided interaction. These can be summarised as the need to:

- recognise children's different preferences
- avoid focus on computers at the expense of a broad range of technologies
- acknowledge the range and diversity of children's early experiences at home and the ways in which parents, siblings and carers induct children into culturally significant technological practices, and
- extend their vision of the nature of children's technological competences beyond operational skills.

The National Association for the Education of Young Children claims in its position statement that 'Technology tools can help educators make and strengthen home-school connections' (NAEYC, 2012: p7). This means developing existing mechanisms to support links between home and school so that discussions with parents systematically include exchanging information about children's experiences with technology. Educators can build on this, shifting the current focus on skills towards a broader range of competences and dispositions and recognizing that children will start school with diverse experiences of using digital media, involving not only

computers but also a range of leisure technologies and interactive toys.

Our research suggests that technologies can expand the range of opportunities for children to learn about the world around them, to develop their communicative abilities, and to learn to learn. We believe that children's early experiences of playing with the various technologies available to them at home or in preschool settings can contribute to this learning, particularly when they are helped by supportive adults and more able others who monitor activities, help when things are difficult, provide encouragement and praise for achievements, and

assist children to manage their emotions if they get frustrated. In other words, when children benefit from guided interaction.

Educators are expert at providing responses that are intuitive and finely attuned to children's specific circumstances and abilities but they can find this more taxing when technology is involved. The technological landscape changes quickly and as new applications and technologies are developed, new opportunities and challenges will emerge and the need for guided interaction will be renewed.

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Tablet Technologies in Early Childhood: Pedagogical Possibilities and Limitations

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Abstract

Drawing from recent research literature, this article analyses the paradigmatic and pedagogical shifts occurring in early childhood education due to the emergence of new digital technologies. Over the past decade the role that computers and other digital technologies have played in supporting young children's learning have been well documented. However, new pedagogical possibilities to support children's play, learning and inquiries are arising due to tablet technologies (For example, Apple iPads, Kindle or Google Chrome OS). This article has reviewed and analysed recently published research findings in the Australian early childhood context (preschool through to the first year of primary school) considering how tablet technologies are used and understood in this environment. A critical discourse analysis has identified pedagogical possibilities and limitations experienced by teachers, children and their families, when tablet technologies are used as a resource to support children's play and learning.

Tablet Technologies and Early Childhood

Eight years ago in this journal, Yelland and Kilderry (2005) documented some of the pedagogical shifts occurring in mathematics education due to the use of information communication technologies (ICT) across the early childhood curriculum. By addressing the question, 'what is effective teaching and learning with ICT?' we illustrated the ways in which pedagogies were shifting to incorporate ICT across the curriculum (p. 37). It was concluded that children were able to 'actively explore, inquire, problem pose and problem solve using a variety of ICT to represent their learning *in ways that were not possible* [author italics] without the technologies' (Yelland & Kilderry, 2005, p. 39).

New digital technologies continue to transform pedagogy and curriculum in early childhood. Opportunities now exist for young children to learn interactively through new digital media, in particular, tablet technologies (Apple

iPads and other touch screen mobile tablets, such as Kindle or Google Chrome OS). More versatile and child friendly than computers, easily transportable and interactive, tablet devices are transforming children's play and learning. The divide between children's real-life play and the virtual world is blurring (O'Mara & Laidlaw, 2011). For example, O'Mara and Laidlaw (2011) describe an episode where preschool children have a 21st Century tea party, complete with digital cakes and tea (game application on tablet device) which are served to their friends and stuffed toys in the real world context. It is this type of playful exploration where children use new digital technology to extend their real-life play and learning that is becoming more commonplace, requiring a rethink of pedagogical repertoires used in early childhood (Yelland, 2011).

The Studies

Research studies were selected for the analysis based on the date of publication (between 2011 and February 2013), where tablet technologies were a focus of the study, and the research was conducted



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in an Australian early childhood context. A total of three research publications, two peer-reviewed articles (Lynch & Redpath, 2012; Verenikina & Kervin 2011) and one non-peer reviewed report (Yelland & Gilbert, 2013) were identified and analysed (hereon referred to as ‘the studies’). Across the three studies, adult participants comprised teachers, parents and grandparents, with children participants aged from 2 years through to 6 years. Each of the three studies is introduced in turn.

Study 1: Paradigmatic Tensions in iPad use in an Australian Preparatory Classroom.

Lynch and Redpath (2012) investigated teacher and student use of networked ‘smart’ technologies in literacy education in one Australian Preparatory classroom, where children were 5 to 6 years of age during their first year of compulsory schooling. Lynch and Redpath (2012) found signs of transformative pedagogy brought about by the use of iPads and iPods. With possibilities to transform literacy education due to their portability, accessibility and multipurpose applications (apps), Lynch and Redpath (2012) documented a newly graduated teacher’s journey using iPads in an early childhood classroom. Conceptualising the research within a ‘pedagogies of empowerment’ frame, Lynch and Redpath (2012, p. 24) illustrated some of the opportunities and affordances tablet technologies could bring about in early childhood literacy practices. Based on their findings, they argue that the pedagogy of the teacher is fundamental to the way new technologies such as iPads are used in early childhood.

Study 2: iPads, Digital Play and Pre-schoolers

In their study, Verenikina and Kervin (2011) investigated what digitally mediated imaginative play looks like in the home environment for three families with preschool aged children (3 - 4 years of age). Their investigation asked questions such as – How do parents view the role and place of digital technologies in the lives of children? and How do pre-school aged children respond to

[these] applications offering varying opportunities for play? (p. 7). Verenikina and Kervin (2011) interviewed parents and videotaped and observed children playing using selected iPad software. Similar to the findings of the other studies reviewed in this article, Verenikina and Kervin (2011) found that children’s engagement depended on the features of the app and whether they were able to manipulate and be creators of knowledge.

Study 3: iPlay, iLearn, iGrow

In their reconceptualising *KidSmart* research project, Yelland and Gilbert (2013) investigated what effective pedagogies could look like when 95 young children, aged 2 to 6 years, were given the opportunity to learn through the use of tablet technologies to further their literacy and numeracy skills and knowledge. They found that the tablet technology context for 2-3 year-old children supported rich language interactions and provided collaborative opportunities for young children to practise new vocabulary. Similarly, a tablet technology context for 4-year-old children afforded opportunities for children’s social interactions among their peers, along with the ability to easily and swiftly investigate and document learning experiences in a play-based program. The use of tablet technologies in the first year of school enhanced children’s foundational learning including number recognition, comprehension and writing skills in a ‘multimodal context using aural, visual and linguistic stimuli’ (Yelland & Gilbert, 2013, p. 14). The multimodal learning options made possible through tablet technology use was particularly successful for children who did not have English as their first language, as the apps could be used to suit the individual child’s preferred learning style and pace.

Analysis

A critical discourse analysis (CDA) (Fairclough, 2001, 2003) has been conducted on the research findings presented in the three studies introduced above. The aim of the analysis is to investigate the discursive construction of pedagogy surrounding the use of tablet technology in early childhood. Examining discourse (language and social practices) use across the three studies



allowed for an investigation into social interaction, production and interpretation of social practice (Fairclough, 2001). The CDA examined discourse in the three studies with the aim of investigating:

- how tablet technologies are being used to support children's play and learning;
- the pedagogical opportunities and limitations experienced with tablet technologies in early childhood;
- evidence of new discourses (language and social practices) emerging with the use of tablet technologies in early childhood.

The findings are divided into two main sections, the first outlining the pedagogical possibilities of using tablet technologies in early childhood, and the second section discussing pedagogical limitations.

Pedagogical Possibilities

Pedagogical possibilities experienced by children, teachers and adults through the use of tablet technologies are evident in all three studies. Pedagogical possibilities are revealed in discourse and illustrate ways of teaching and learning that may not have been possible without tablet technologies, thus extending practice and providing other options and learning opportunities.

Initially, Monique a Preparatory teacher using iPads, felt 'constrained by a strong sense of having to continue with established classroom practices' (Lynch & Redpath, 2012, p. 13). However, later in the school year she was more confident with her pedagogy using iPads in the classroom and could think outside traditional notions of literacy education. Monique explained how tablet technologies expanded her pedagogical practice:

...sometimes they [Preparatory students] think "Oh, yeah, I've done this work" and it gets stuck in their bag and that's sort of it. They can only show certain people who are there, but with this – like they can ring up Grandma and say, "Oh Grandma, go onto YouTube and look at this!" And like Jack [Prep student] said, he was really proud of himself after he had done it. They're learning more about how

much you can do on iPads, like they're amazing – they're not just games and apps. You can use different sorts of apps to produce something and then like...that instant transfer onto the Internet...they're learning that they can do something and then show the world basically or show lots of different people. I think they are learning that you can use other forms – like multi-literacies... (Lynch & Redpath, 2012, pp. 19-20).

Similarly, examples in the Yelland and Gilbert (2013) study illustrate how tablet technologies have an untapped capacity to support children's investigations and explorations. One kindergarten teacher (of 4-year-old children) in the study, Naomi, explained that she was only beginning to realise the potential of using iPads to follow children's interests and investigations in the classroom. She said that she was 'keen to use the tablet to access the Internet to research children's interests and ideas, and had done so on several occasions' (p. 12). Some examples of practice mentioned by Naomi are:

- 'Watching a video clip of a volcano eruption in response to the children's interest in volcanoes and following-up with several science experiments conducted in the sandpit.
- Watching the metamorphosis process of caterpillar to butterfly following the discovery of a cocoon in the outdoor area.
- Researching how to make stop motion animation films and then creating our own.
- Identifying various bugs discovered in the outdoor area using the *Museum Victoria Field Guide* app'. (Yelland & Gilbert, 2013, p. 12).

In the Verenikina and Kervin (2011) study, it is parents of preschool children who note the pedagogical possibilities afforded by the use of tablet devices. For example, the father of Adrian, a 3-year-old child in the study, explains how capable and sophisticated Adrian's play is in the digital environment. Adrian's father, Jarrod, says:



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[3-year-old Adrian's] current favourites are puppets ones [educational games as apps] where he can create his own story...He liked also those which you can match the colours, shapes, objects and animals. He tried a few interactive games and he now knows outcomes and he moved beyond those to another realm of creating concepts...he moved to those where you can create your own concepts... He creates a story, plays it out, listens to it and deletes it and starts all over again. It is interesting that he moved away from the games where you follow the game or a story from the beginning to the end, to something more spread out...he creates his own puppet shows. (Verenikina & Kervin, 2011, p. 11)

Pedagogical possibilities enabled by the use of tablet technologies in early childhood have been identified across all three studies. Monique, the teacher in Study 1 (Lynch & Redpath, 2012, p. 19), describes the possibilities opened up by the use of tablet technologies in her classroom in terms of positioning 6-year-old children as '*producers and owners of their learning*' and as active participants in a learning community that *extends beyond the classroom* [author italics]. Pedagogical possibilities afforded by tablet technology highlighted in the Verenikina and Kervin (2011, pp. 11-12) study provide '*another realm of creating concepts*' and add an '*additional dimension*' [author italics] to children's learning. In the Yelland and Gilbert (2013, p. 6) study, pedagogical possibilities created by the use of tablet technology are discussed as *providing opportunities* for children's social interactions and *enabling* 'multimodal learning' [author italics] with children easily accessing information to support their explorations.

Pedagogical Limitations

Pedagogical limitations are illustrated through the way children, teachers and adults in the three studies describe limitations or restrictions when tablet technologies are used to support children's learning. The CDA (Fairclough, 2001; 2003) has revealed pedagogical limitations surrounding the use of the tablet technology in early childhood across the three studies. Terms such as: 'limitations'

'restrictions' and 'inadequacy', where searched for across the three studies' findings. Pedagogical limitations were identified, but interestingly they did not focus on children's overuse and unhealthy screen time, or prolonged solitary use of the tablet device. Instead, limitations raised by the studies focused on adult understandings about how tablet devices can be used (or not) to support children's learning, rather than mentioning limitations with the device itself. These issues are now explained further.

Limitations of a Traditional Teaching and Learning Paradigm

A limitation identified in the Lynch and Redpath (2012) study is where pedagogy suitable for tablet technology use in early childhood is limited by traditional notions of teaching and learning. For example, the preparatory teacher in the study, Monique, noted her initial dissatisfaction with the way tablet technologies were used to fit existing and traditional pedagogy and literacy practices at her school, rather than opening up new ways of learning. Monique explained:

Because I think that's how technology should be; it should be sort of integrated seamlessly, not just: "*this is the hour when we use the iPads*" and that's it (original author italics). So I'd like to also see myself and the kids using them across the whole curriculum (Extract from Teacher Interview Term 2, 2011 in Lynch & Redpath, 2012, p. 14)

Initially, Monique was constrained by practices established by teachers before her and was 'constrained by a strong sense of having to continue with established classroom practices and structures and processes prescribed by a centrally administered literacy programme' (Lynch & Redpath, 2012, p. 13). Later in the study, Monique makes the pedagogical shift from using 'closed apps to deliver content, [to positioning students] as producers of their own content' (Lynch & Redpath, 2012, p. 20). This pedagogical shift takes children's learning through apps on an iPad in a 'contained

within a content-specific app' to that where children experience 'fluidly [moving] between apps and their self-created digital content to create a multimodal text that is then shared with their community' (Lynch & Redpath, 2012, p. 20).

A pedagogical limitation revealed in the Verenikina and Kervin (2011) study was connected with the pedagogical paradigmatic tension experienced by Monique (above). That is, where adults limit or restrict the use of tablet devices for children's play and learning. For example, 3-year-old Adrian, a participant in the Verenikina and Kervin (2011) study, was competent at playing digital games on the iPad at home, yet was not allowed such use of technology at preschool. After explaining how sophisticated Adrian was at playing digitally on his iPad in the home environment, Adrian's father stated that at the preschool Adrian attended 'children are not allowed to even touch the computers – the technologies are predominantly operated by the caregiver' (Verenikina & Kervin, p. 11). Conversely, later on in the study, further detail is provided to show how capable and sophisticated Adrian's play and learning was with the tablet device in his home environment.

The Misnomer of 'Educational' Apps

Parents within the Verenikina and Kervin (2011) study conveyed that they preferred their children using iPads for educational reasons, rather than just for games. However, the Verenikina and Kervin (2011) study showed that once the skills in a particular educational game were mastered; children lost interest and wanted to move onto the next challenge. Whereas, with iPad games

children in the study used 'their imagination [to] develop their own play that extended beyond the screen as digital play blended in [with] the variety of children's other play contexts' (Verenikina & Kervin, 2011, p. 17). Thus, a pedagogical limiting factor illustrated by the study's findings is the way 'educational' apps were selected by adults thinking that they promoted exploration and learning. While the findings in the Verenikina and Kervin (2011) study cannot be generalised due to a small sample of participants, the findings do indicate the importance of adult understandings about the nature of young children's learning and play opportunities that can either be extended or limited in a digital context.

Conclusion

Three recent empirical studies published between 2011 and February 2013 where tablet technologies were a focus of an Australian early childhood study were reviewed in this article. A critical discourse analysis found that pedagogical possibilities and limitations exist when tablet technology is used to support children's learning. The analysis has illustrated the importance of adults thinking outside traditional notions of pedagogy, as this way of thinking may limit children's explorations and learning opportunities in a digital context. To fully utilise tablet technologies in early childhood, educators will need to provide opportunities for children to learn and explore in multimodal and creative ways.

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平板電腦與幼兒教育課程：香港的經驗 Using Tablet Computer in the Early Childhood Education: The Experience in Hong Kong

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摘要

平板電腦 (tablet personal computer) 是一種近年來新興的資訊科技產品，開始逐步運用於幼兒教育課程中。本文透過香港教師和幼兒使用平板電腦的革新型教學情形，探討和分析平板電腦對在本地幼兒教育課程中的教學策略及其有效性，其中包括關注平板電腦提升幼兒的創意性，主動探索周圍世界和語文能力方面的支持作用。

Abstract

The tablet personal computer is an innovative technology, which has provided multiple learning opportunities for young children's learning in the recent years. This paper presents innovative learning strategies and effectiveness in using tablet computers to support young children's creativity, exploration, and the literacy competence.

引言

新興科技每日都在不斷推陳出新，資訊科技教育的推動亦須顧及到潮流的變化與應用，然而，現今行動學習運用於教育上已成為一項新趨勢與發展，而平板電腦則是現今最受歡迎的行動輔助教學資源之一，許多國家亦開始嘗試在課堂教學中引入平板電腦，以探索新技術的教學應用，如美國、澳洲、星加坡等國家。與此同時，我們亦不得不承認，平板電腦成為新興的教學媒體有著其獨特之優點，而引入其於學前教育中也是為了未來教育，有利於培養幼兒自主學習能力，並促進教學效能。

何謂平板電腦

平板電腦 (tablet personal computer)，是一種以觸控式螢幕作為輸入裝置的小型個人電腦，使用者可以觸控筆、數字筆，甚至是手指觸控來操控輸入而非傳統的鍵盤和滑鼠。由於內建的手寫辨識、語音辨識和虛擬鍵盤等進行操作，比傳統電腦簡單易用和方便攜帶。

平板電腦的特點

程少華 (2012) 指出，平板電腦具有超大的彩色觸控螢幕，能夠任意地改變字體大小或類型，可以連接無線網絡，提供瀏覽互聯網、收發電子郵件、觀看電子書和照片、播放音頻或視頻、玩遊戲等功能。使用者更可以透過不



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同系統之網絡程式商店下載各種免費或付費的應用程式 (apps) (唐玄輝、蔡艾靜等, 2012)。平板電腦基於多點觸控板的原理, 簡單直觀, 對幼兒而言容易操作, 僅需要透過小肌肉和大肌肉的配合實現基本觸控的效果。常見的六種基本觸控手勢, 例如輕觸, 雙擊輕觸, 長按, 掃動和縮放手勢都較容易讓幼兒操作。這與幼

兒成長歷程中的手指操控較為相似, 例如用食指點擊, 拖拉, 掃動等動作。平板電腦不需要外接電源, 其電池持久性也支持課程中的可行性, 例如 iPad 能夠支持無電源的情況下 10 小時的使用。以下表一是從平板電腦與筆記型電腦的特徵去比較它們在教學上的優缺點。

表一 平板電腦與筆記型電腦於教學上的使用比較

	筆記型電腦 (Notebook computer)	平板電腦 (Tablet computer)
便攜性	體積比平板電腦略大, 不便攜帶外出進行教學活動, 且每次使用均需打開才能使用, 不便幼兒單獨使用。	體積細小, 攜帶方便和便利使用, 配合幼兒小肌肉的發展, 不用幼兒拿着較重的筆記型電腦進行學習, 方便幼兒進行個別或分組活動, 有利發展行動學習。
易用性	需要透過鍵盤輸入及滑鼠等設備, 若幼兒不懂打字的話, 則全靠老師協助輸入, 不利於以兒童為主導的學習模式。	由於特別增設了手寫功能, 可直接以手寫或點按輸入, 而書寫後, 透過軟體辨識 (類似 PDA 之模式) 而轉換成字元或圖形, 就算幼兒語言發展有限, 不懂寫字也能透過繪畫形式或語音識別系統作輸入。
即時性	雖可透過連接上網進行即時搜尋, 但由於課堂時間所限, 筆記型電腦開機需時較長, 不便即時上網進行搜查檢索。	開機速度較快較方便, 對於幼兒所提出的疑問可即時上網搜尋跟進, 並能即時解答, 能滿足幼兒天生好問的特性。
功能性	含多媒體功能, 老師可配合課程需要利用其作為輔助教學的道具。且利用鍵盤輸入, 較方便老師製作電子化教具及教案等文件。	與筆記型電腦一樣含多媒體功能, 包括上網、電郵、看影片和文書處理等, 方便幼兒當作電子書及電子書包使用。此外, 部份平板電腦具拍攝相片及錄像功能, 教師或幼兒都可進行拍攝或錄影等記錄, 此乃筆記型電腦無可取替的優點。
教育性	只要連上網路, 網絡世界將有許多不同的網頁或教學資源可供教師或幼兒使用。	可集中於專門下載應用程式與遊戲的 Apple app store 或 Sumsung apps 進行搜尋, 教師更可按需要搜索到許多適合幼兒的免費應用程式與遊戲配合教學。

文獻探討

平板電腦與幼兒學習的關係

1. 激發幼兒的主動學習動機

傳統的幼兒班房所採用的教學媒介大都是靜態而欠缺趣味性和遊戲性, 大部份幼稚園都以紙本教學為主, 較難實踐以兒童為主的教學模式。然而, 許多學者均指出遊戲對幼兒是一個理解世界的工具, 喜愛遊戲是幼兒的天性,

他們在遊戲的過程中探索可能發生的經驗, 並在探索的過程中學習 (曾韻如、黃奕誠等, 2012)。事實上, 平板電腦所含的多媒體功能, 創造新型的互動學習經驗, 連接網上軟件商店就可即時下載上百款好玩且具學習意義的應用程式或軟體, 以遊戲為媒介強化幼兒的學習動機與滿足感, 讓教學也可以和遊戲一樣生動、活潑和有趣, 從而達致預期的學習目的。教師

亦能透過平板電腦科技的融入，令幼兒透過有趣的語文、數學、繪畫等活動，能在親身的體驗與操作下內化學習 (Shifflet & Toledo, 2012)，有利於教學上的模式轉向。

2. 增加教學彈性和靈活性

根據美國幼兒教育協會 (National Association for the Education of Young Children 簡稱NAEYC, 2011; Information Society for Technology in Education 簡稱ISTE, 2007) 所言，幼教老師若能積極的尋找一個適合將科技融入教學的方式，對於幼兒數學邏輯、社會情緒、語文等方面的發展與幼兒創造力的提昇都會有很大的助益，而會靈活運用不斷進步的科技與工具，更將是兒童日後長大所需具備的能力。因此，該會提出了五種融入方式：

1. 電腦應該設置在教室中而非孤立於電腦教室。
2. 將科技整合到平日的教室活動中。
3. 選擇課程內容豐富軟體來進行教室活動。
4. 使用科技整合跨領域的課程。
5. 延伸課程，用科技提供新的方法和觀點 (方顯璇、廖衮儀，2005)。

幼兒教師若能恰當地應用平板電腦融入教學，就能達致以上五種融合方式，其輕便的特點令課堂不用再侷限於固定時間、空間和地點，不再只孤立於電腦室內進行，進而大大增加教學彈性，讓師生間的教與學可隨時隨地進行，易於將科技整合於日常教室活動中，令致學習更具成效。此外，網絡上應用程度的多樣化，可視為大型教材庫，做為補充教材來進行教學，有助整合跨領域課程。因此平板電腦將會是其中一種愈來愈多運用到校園內的科技設備 (Garland, 2006)。

3. 促進幼兒主動參與學習

Shifflet & Toledo (2012) 認為3至6歲的幼兒能很快地學會使用平板電腦作為一種媒介來表示他們的想法和學習，透過其多媒體特性中的影像、文字、音樂、語音等具有聲光、色彩、動畫等多采多姿的媒體內容，有助於認知基模的建構、同化與調適，對學習大有幫助。

此外，就建構論所言，教學應盡量安排一些實際的學習情境，給幼兒有機會去經歷真實的世界，去操弄實際的學習活動，幼兒才會主動參與學習 (陳啓榮，2006)，而平板電腦具有虛移教學的特性，可將部份幼兒未能親身體驗的現象或實驗透過虛擬的方式呈現，讓幼兒對所學的內容更了解。除此以外，平板電腦的觸控手寫模式能易於操控掌握，相比運用傳統電腦來說，幼兒更容易主動及獨立地運用，並增加使用它來創建和表達自己的思想 (Couse & Chen, 2010)。

4. 增加幼兒間之互動合作機會

資訊科技融入幼兒學習活動，可增進幼兒正向社會發展能力與態度，支持幼兒同儕在資訊科技融入學習環境的互助性與合作性，學習團隊合作與對話溝通來提提社群學習之自我實現 (Hyun, 2005)。幼兒同儕喜歡相互觀摩電腦遊戲的操作，當他們一起使用平板電腦進行學習時更會增加意見分享和交流的機會，還會互相協助尋找好玩的應用程式 (Shifflet & Toledo, 2012)，並以正向回饋方式來呈現遊戲操作過程的社會行為，接納同儕情感支持並表現更有自信，引發同儕正向情感支持的社會行為 (廖晨鈞、林聖曦，2010) 例如：相比傳統的美藝創作活動，幼兒較少共同創作同一幅圖畫，但運用平板電腦中的繪圖應用程式，幼兒則較多互動合作機會，亦更願意與同儕合作共同創作 (Shifflet & Toledo, 2012)。

實際運用平板電腦的經驗

1. 使用平板電腦進行創作活動

許多兒童在成長過程中曾有手指畫 (finger painting) 的經驗。手指畫的優點在學術研究中曾受廣泛認可，學者們早在40年代的研究中就開始關注手指畫對幼兒發展的幫助，研究發現幼兒透過手指畫可以宣洩情緒，能夠幫助用簡單的畫畫技能表達自己的內心世界 (Arlow and Kadis, 1946)。手指畫簡單容易操作，但是在實際幼稚園環境中，卻經常碰到環境和材料方面的限制，手指畫不能隨時隨地的進行。如今，使用平板電腦中的繪畫程序，幼兒可以直接用手指在屏幕上操作手指畫的功能，而其中的技



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術除可以完成手指畫的功能以外，還添加了各種不同的藝術效果，令幼兒用手指便可以實現不同的有趣畫作。例如Android的“Markers”軟件，支援多款畫筆效果。在畫板中還可以選擇「後退」，「清除」等功能，令幼兒可以透過簡單的點擊屏幕和直接使用手指「塗」，「畫」，「變

形」，「選擇顏色」甚至還有「特效」等功能。以下情形中，平板電腦不僅可以幫助能力不足以控制筆畫圓圈，或精確操作鼠標的幼兒可以自行在屏幕中自由創作。另外，作品容易儲存和分享，可以提供許多機會讓幼兒有機會回溯。

圖一：創作聖誕樹



圖片資料來源：上水惠州幼稚園（分校）

幼兒年齡：5-6歲 時間：15分鐘

主題：聖誕樹

應用軟件名稱：Markers（免費）

教師在活動前示範應用軟件的使用，之後幼兒直接用手指在平板電腦上繪畫。參與的幼兒大多表現興奮，表現出很高的參與程度。應用軟件的程式設計適切，將常用功能例如顏色顯示在頁面，只有少數進階功能隱藏，讓學生容易操作，亦可鼓勵多嘗試用不同顏色、筆跡和效果；比起一般紙筆繪畫，電子畫板的「擦膠」及「復原」功能有助幼兒多次嘗試，亦可在繪畫過程中更改或刪除圖案，尤其是「復原」的功能，可以讓幼兒回復到上一步或之前的步驟，令幼兒可以有機會重建和修改自己的經驗。此外，在畫畫的過程中，幼兒可嘗試不同的效果，透過「復原」後再重新嘗試和呈現新的效果。這是傳統紙筆繪畫和用鼠標畫畫所不能達到的，而傳統的繪畫活動中，幼兒每次一般只能完成一個畫作，而用電腦時操作鼠標畫畫對幼兒的小肌肉水平亦相對較高，所以較難實

現複雜的畫面。以下列出以平板電腦進行繪畫創作的優點：

- 可隨意調節使用畫筆的效果
- 可選擇顏色的喜好
- 個性化的表達方法，發揮創意
- 畫畫過程中可表達自己的情緒
- 只需要很少的技能，讓小肌肉發展未完全成熟的幼兒可純熟地操作
- 安全性高，工具容易操作
- 可與同伴合作完成

2. 使用平板電腦進行探索及記錄周圍世界的的能力

平板電腦的一個重要特點是具有很強的便攜性，這大大增加幼兒主動學習和操作的機會。更幼兒可隨時隨地使用平板電腦來搜尋互聯網上的資料和使用攝像功能記錄周圍環境中



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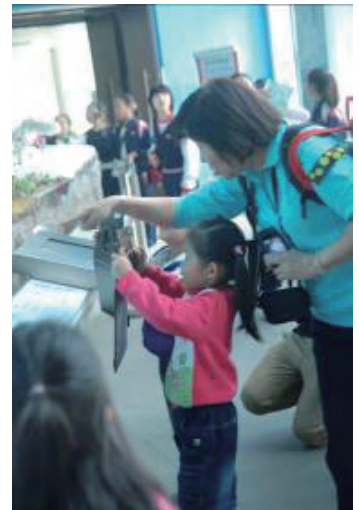
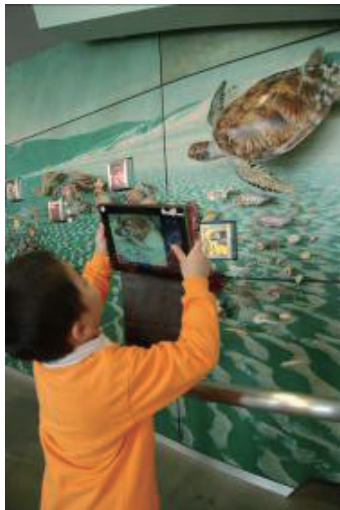
所發生的事情，這對於擴展幼稚園的課程內容有著重要的支持作用。例如將平板電腦融入戶外、參觀和小組合作等不同形式的活動均可讓幼兒靈活地探索周遭世界。如以下圖片所顯示的教學情景中，幼兒攜帶平板電腦到濕地公園進行戶外參觀。過程中，教師可以隨時隨地安排幼兒進行討論活動，如幼兒提到對某生物有興趣，教師可即時幫助幼兒從網上查找資料。在幼兒有興趣和動機去了解周圍事物時，透過平板電腦作為平台可以滿足幼兒好奇心和探究的意願，幼兒是學習的主動參與者（Copple & Bredekamp, 2009）。此時，平板電腦對於幼兒而言猶如一個視聽結合的互動資源庫，可即時提供鷹架，滿足幼兒好奇心。教師的角色由傳統課堂的信息傳授者轉化成為學習過程的支持者，幼兒的角色由被動的接受者，變為主動信

息的獲得者，能夠透過查找與濕地公園中相關的動物和植物關聯的網頁，影片，文字資料，圖片等。

另外，幼兒也可獲得操作平板電腦的機會，在探索過程中隨機的記錄相片、影片或錄音，此時平板電腦又可以發揮其作為資訊科技工具的作用，幫助幼兒建構知識。透過幼兒所收集的材料，能夠幫助教師了解幼兒觀察世界的角度，可讓幼兒分享自己所觀察的興趣。實際經驗中，幼兒所觀察的角度都有其自己的興趣、愛好和獨特的發現。有的幼兒喜歡濕地公園中的動物，有的幼兒喜歡記錄各種不同的植物，或者某一類獨特的食物，在分享活動中亦可讓學習者有更多合作機會，互相分享探索的歷程。

圖二：戶外平板電腦的情景

幼兒年齡：5-6歲 地點：濕地公園
運用平板電腦的功能：網絡搜尋資料，攝像



圖片資料來源：青衣商會石蔭幼稚園

使用平板電腦進行探索的優點：

- 便攜性強
- 提供即時上網的機會
- 可提供和儲存視覺、聽覺、文字等多媒體資料

- 幼兒可親自操作進行拍攝，錄影及錄音等功能
- 幼兒與資訊科技的互動性增強



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3. 使用平板電腦提高幼兒的語文及溝通能力

平板電腦可以安裝不同的應用程式來擴展內容。隨著應用程式的普及，越來越多有趣的應用程式可以用於教學活動中提升幼兒的語文及溝通的能力。幼兒可以自行透過平板電腦閱讀大量兩文三語的有聲電子圖書及遊戲化的溝通應用程序。有別於傳統的學習材料，多元化的應用程序給予幼兒各種多元化的互動機會，功能包括配音，動畫，繪圖及書寫工具，互動練習如連線等，幼兒可與學習內容進行互動。此外，平板電腦還可以靈活的設計書寫活動，另幼兒可以將書寫變為主動經驗的建構，例如圖片揮春的製作及「春」字的書寫，可以讓幼

兒配合不同的圖畫書寫文字。根據幼兒讀寫萌發經驗，提供適切的情景，讓幼兒有適切的文字環境，培養幼兒對文字的興趣（陳淑琴，2000），平板電腦提供有趣的書寫方式，例如動畫提示書寫，筆順演示，字形演示配合圖畫演示等，讓幼兒可以將枯燥的操練和遊戲結合，令學習過程更加有趣。傳統的電腦程序缺乏互動的元素，令活動過程單調操作，而現今的互動媒體可令幼兒在遊戲過程中增強溝通和互動的能力，例如應用軟件“Talking Cat Tom”（見下圖三），可讓幼兒與一隻名為“Tom”的貓進行對話，軟件記錄幼兒的語言，再透過重放（repeat）的功能來展示幼兒的話語。

圖三：使用平板電腦進行語文活動



圖片資料來源：(a)現代教育研究社有限公司 (b)Talking Tom Cat app screenshot

建議和總結

以上的使用經驗，僅為香港幼兒教育中平板電腦的部分情形。平板電腦作為一種革命性的新興教學工具走入課堂，從正面的角度能夠提供更多元化的學習機會，然而並不能完全取代傳統教學形式，更不能取代幼兒教師在教學中的重要角色。筆者們相信，平板電腦輔助配合極有價值的真實性和探究性活動將會豐富幼兒的學習經驗，提供更多創新的機會。故幼師在編排教學活動時應全面關顧幼兒的不同學習經驗，盡量運用平板電腦補足傳統教學上之不足（Shifflet,2012; Couse & Chen,2010）及發揮創意。現在平板電腦在幼兒教育的研究才剛剛

起步，實踐者應更加綜合考慮幼兒的需要以及實際學校活動的環境，因應幼兒的發展和課程的內容來選擇最適切的媒體和教學策略。如使用不同操作系統 iPad 和 Android 大致上操作相同，但在應用程式方面有部份不能在兩個系統共享。另外值得注意的是，因系統設計原因，只有 Android 可以瀏覽 Flash，所以購買前要考虑學校的實際情況，包括平板電腦的尺寸，學校的網絡環境，如是否有 Wifi 等硬件條件。Bales (2011) 提出在幼稚園學習活動中使用平板電腦應留意以下幾個方面，其中包括選擇關注平板電腦的適切性，幼兒學習中需要平衡各種多元化的經驗，以及成人在使用時的角色：



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- 尊重幼兒的發展適應性
- 確定平板電腦在學習活動中適切性
- 當作是多種學習材料中的一種
- 用於探索和發現過程
- 用於合作學習的過程
- 讓所有幼兒都有機會接觸
- 應在成人的輔助下使用

作為專業幼师，我們應懂得為幼兒選擇最適合和健康的平板電腦軟件教材，至於如何選擇將是未來研究中的一個重要方向。目前關於選擇應用程序的研究還很有限，許多研究者開始探索各種類型的應用程序對於幼兒學習成效，但仍未有綜合的評述。筆者建議可參考二零一二年 NAEYC 所提出的幾個軟體評價原則去揀選，比如軟體是否開放，是否能讓幼兒自己作出決定；是否包含各種感知、聲音、音

樂、動畫等多元化的形式；是否反映幼兒的已有經驗並以這些經驗為基礎；是否與現實生活中的問題密切相關；是否能引起幼兒興趣等方面。在選擇應用程序時，教師不單需要留意選擇應用程序的內容，更需要從操作的角度考慮幼兒的能力和具體使用的環節，這也是未來研究中需要關注的內容。

另一方面，目前雖然並未有研究顯示幼兒應用平板電腦會造成健康上影響，但課堂上使用平板電腦所帶來的健康問題也應值得教師們注意，這也是未來教學和研究中需要關注的問題。例如，長期低頭使用亦容易造成腰頸等肌肉的勞損問題和引發幼兒的視力問題。因此，我們在使用平板電腦進行教學的同時，更加需要去探尋和培養教師和幼兒健康的使用方法和態度。

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初探香港特殊幼兒中心運用資訊及通訊科技的現況

The Use of Information and Communication Technologies (ICT) for Children with Special Needs in Hong Kong Special Child Care Centres: A Pilot Study

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摘要

本文主要探討香港的特殊幼兒中心在運用資訊及通訊科技（以下簡稱ICT）予特殊幼兒學習的情況及成效。從回覆問卷的十八間中心所搜集數據及隨機抽取二間中心之二位同工作訪談的資料，結果顯示雖然香港的特殊幼兒中心運用了不同的ICT以輔助教學，從而提升有特殊需要幼兒的學習動機，不過香港大部分的特殊幼兒中心都缺乏ICT的配套，因此，本文作者建議政府須投放更多及更完善的資源，讓更多有特殊需要的幼兒能接觸適切的ICT作為輔助他們學習之其中工具。

Abstract

This paper aims at exploring the current practices in the use of Information and Communication Technologies (ICT) with children who have special needs in Hong Kong special child care centres (SCCCs). This study surveyed all Hong Kong SCCC and interviewed two experienced personnel at SCCC. The results of the study revealed that there were many kinds of ICT that assist teaching to enhance the learning motivation of children with special needs, however, majority of the SCCC received inadequate support of ICT resources. Therefore, it is recommended that more ICT resources should be allocated by government to support the learning of children with special needs.

引言

教育統籌局（教統局）於一九九八年發表的「與時並進－善用資訊科技學習」的五年策略中，明確訂立發展資訊科技教育的措施，並積極推廣在教與學過程中協助教師及學校利用資訊科技提高教學質素。此外，香港課程發展議會於二零零六年為服務二至六歲的學前機構而編訂之《學前教育課程指引》，亦把「科學與科技」納入為幼兒教育其中一個重要的學習範疇。因此，不少幼兒學校為了追求優質的幼兒教育，他們皆不遺餘力地在校園內推行資訊及通訊科技（以下簡稱 ICT）。ICT 通常包括電腦硬體及軟體、數碼相機、攝錄機、互聯網、電子通訊產品、可程式式的玩具等不同的工具及資源。不少研究也指出發展和運用 ICT 教學對有特殊需要及正常幼兒的生活與學習同樣

重要（陳儒晰和黃金花，2009；Hutinger, Bell, Daytner 和 Johanson, 2006）。所以，為了輔助教學及促進有特殊需要幼兒的全人發展，ICT 已普遍在發展國家之特殊幼兒中心使用（Nkansah & Unwin, 2010）。唯香港極少關注此方面的實證研究，因此本文的作者除了進行一項全港性的問卷調查以探討香港特殊幼兒中心在運用 ICT 以輔助有特殊需要幼兒的學習實況外，亦邀請了兩位特殊幼兒中心的同工進行了深入的訪談，從而分析香港特殊幼兒中心在 ICT 的推行現況，並藉此向政府提出相關政策建議。

利用ICT輔助有特殊需要幼兒學習的效益

資訊科技融入教與學已是全球性的趨勢。特殊教育課程也採用了不少特殊教育科技以輔



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助有特殊需要兒童的學習。不少學者如 Moore 和 Taylor (2000)，Nkansah 和 Unwin (2010) 皆認為 ICT 可以提供特殊需要幼兒的個別學習機會、提高他們在學習的積極性、增加他們在行動上的自由度及休閒或運動的機會，從而拉近他們與現實世界的生活，使他們的自我價值得以提昇。而在特殊教育領域中，運用電腦輔助教學，可使課程在多樣化的教學形式下為有特殊需要兒童提供生動有趣的學習環境，提高教學效益 (冼權鋒、何福全和許令嫻，2003)。

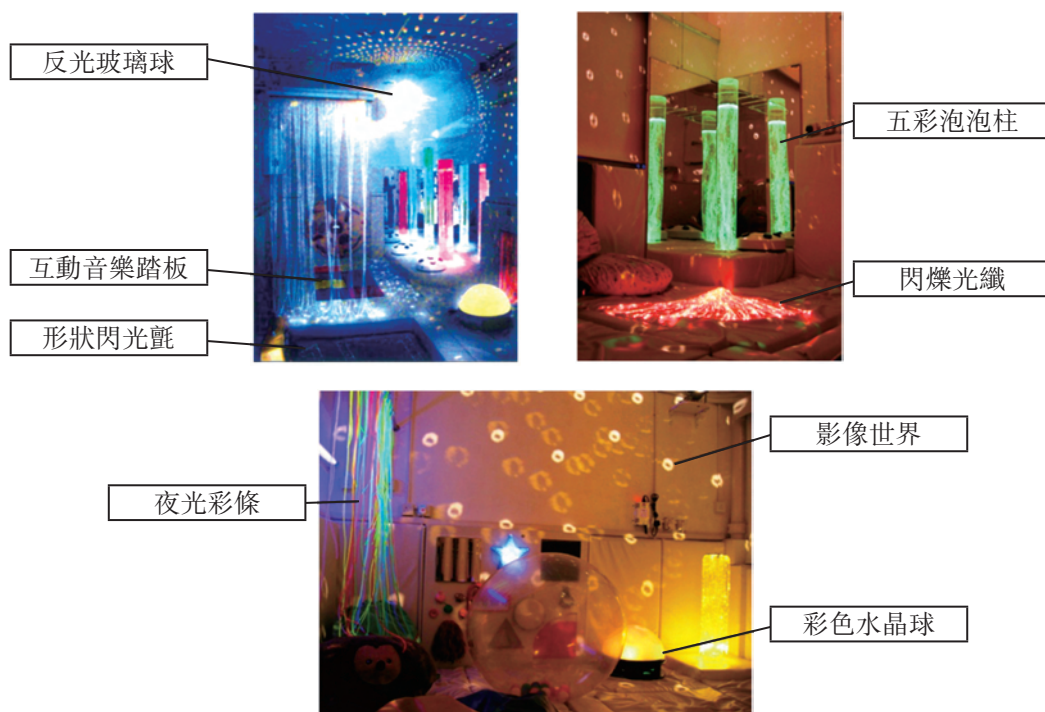
針對特殊教育，ICT 廣稱為輔助技術 (Assistive Technology，簡稱 AT)。而輔助技術的設備如拐杖、助聽器及一些專門軟件等，可增加、維持或改進一個人在學習、工作和與他人互動的能力之工具、儀器或科技系統 (Mavrou, 2011；毛連塹，1999)。而輔助技術設備如調適性的電動玩具，電腦及不同領域的康復工具須依照使用者身心發展需求及功能的

獨特性，使應用在學生生活和學習上，以幫助特殊需要幼兒有效地學習 (Judge, Floyd 和 Jeffs, 2008；毛連塹，1999；何華國，2006)。

除了輔助技術外，為了刺激有特殊需要兒童的感官發展，讓他們透過發現和體驗不同的光、色彩、聲音、氣味、方向、速度及身體的觸覺刺激等，改善他們的聽覺、嗅覺、視覺及觸覺功能外，更藉此提升他們參與活動的能力，使學習成效發揮得更理想。

因此，多感官的設備 (圖一) 如：五彩泡泡柱、閃爍光纖及彩色水晶球均能有效提升有特殊需要幼兒的專注力及身體感官機能的發展 (蘇昱蓁、王欣宜和柯玉真，2012)，唯多感官室的造價需十數萬港元或以上，導致不少香港的特殊幼兒中心礙於經費的昂貴而無法購買相關設備。

圖一：多感官的設備



感官室 (圖片轉載自協康會富昌中心 (2013) 及香港耀能協會鴨脷洲幼兒中心 (2013) 網頁)



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香港特殊幼兒中心運用ICT的 實況

香港特殊幼兒中心

香港特殊幼兒中心是由社會福利署管轄，旨在提供特別的訓練和照顧予2至6歲之中度及嚴重弱能幼兒，以協助他們發展及成長，讓他們為小學教育作好準備（社會福利署，2013）。

研究方法

本研究是融合量化與質化研究法，旨在分析及探討香港特殊幼兒中心運用各種ICT以幫助有特殊需要幼兒的學習及成長之現況及效能。從而讓教育工作者和政策制定者能了解香港特殊幼兒中心現有的ICT資源，以及特殊幼兒中心的同工利用ICT以支援有特殊需要幼兒的學習之教學實況。而研究問題為：

- 香港特殊幼兒中心現有那些ICT資源？
- 香港特殊幼兒中心之同工如何運用各種ICT以幫助有特殊需要幼兒的學習及成長？

本研究分兩個階段：

1. 第一階段：問卷調查

研究對象

根據社會福利署刊於其官方網頁內之34間特殊幼兒中心寄發問卷，而獲其中18間寄回填妥之問卷，回收率為53%。

問卷內容

問卷內容分為以下兩部份：

- 第一部份包括：1) 特殊幼兒中心背景資料；2) 特殊幼兒中心運用各種ICT設備的狀況；及3) 特殊幼兒中心使用ICT的學習效能及使用之滿意程度。
- 第二部份包括：1) 調查特殊幼兒中心的工作人員和學生數量；2) 調查特殊幼兒中心內的類型和有特殊需要幼兒的弱能程度；3) 統計特殊幼兒中心內ICT設備的數量和用途；及4) 評價運用ICT使特殊幼兒在不同方面的發展範疇之觀點、有效性及價值。評分級別由1（最低）至5（最高）。

2. 第二階段：訪談

研究員根據參與第一階段問卷調查之18間特殊幼兒中心，以隨機選取兩位分別在兩間特殊幼兒中心之同工作訪談對象，以深入探討及分析特殊幼兒中心使用ICT學習的效能。研究員透過由特殊幼兒中心主任以隨機抽樣選取受訪者（受訪者的背景資料詳見表一）。

表一：受訪者背景資料

特殊幼兒中心	受訪者	職位	工作經驗
A	丁先生	語言治療師	10年
B	孔姑娘	高級特殊幼兒工作員	30年



研究結果分析與討論

特殊幼兒中心利用ICT作輔助學習的成效

根據回收之問卷，在特殊幼兒中心最普遍之特殊需要幼兒的弱能類別為自閉症，其次是智障，餘下的是聽障、身體殘障、發展遲緩、多重殘障，以及視障和聽障。為幫助這些特殊需要幼兒的成長，有研究指出不同的教育軟件可作為輔助特殊需要幼兒學習的一種教學途徑，並適切有助於他們個人成長發展需要 (Nkansah 和 Unwin, 2010)。而本研究就搜得 65% 的特殊幼兒中心採用不同的教育軟件以促進有特殊需要幼兒的社交技能，其次為中文科、數學概念和語言溝通、英語學習及自我保護能力等學習範疇。由此可見，在香港的特殊幼兒中心最廣泛使用之教育軟件是用以提高有特殊需要幼兒的社交技能。而社交技巧課程的重要性和必要性乃因它可改善及幫助有特殊需要幼兒的人際關係和學業能力 (蘇昱蓁、王欣宜和柯玉真, 2012)。

此外，教學用的電腦軟件是一非常理想的教學工具，它不單具吸引力，而其難度更依據特殊需要幼兒的發展能力而有所調節。所以，教師可利用設計適切的電腦軟件來配合整體課

程上的需要，或特殊需要幼兒依個人的能力及發展水平學習，以達致個別化的效能 (冼權鋒、何福全和許令嫻, 2003)。

但是，就研究結果所得，與輔助技術設備相比下，香港的特殊幼兒中心在 ICT 設備及軟件較少讓有特殊需要幼兒的發展得到幫助。從表二可見 ICT 設備和軟件的平均得分為 3.20，略低於輔助技術設備。最高得分是認知發展 (3.94)，其次是社交及情緒發展和語言發展 (3.65)。其他如小肌、感知、自理和大肌發展等各方面發展分別取得 3.47、3.06、2.41 和 2.24 分。而 ICT 設備及軟件較少讓香港有特殊需要幼兒的發展得到幫助的原因是：

「……因為我們沒有足夠的金錢，而政府亦無資助，所以 (本) 中心的 ICT 設備和教學軟件並不多，正確點說是舊，所以或多或少會影響孩子的學習。」 (孔姑娘)

「……因為缺乏政府撥款，中心不可能時常添置及更新 ICT 設備和教學軟件……。」 (丁先生)

表二：不同 ICT 設備在有特殊需要幼兒各方面發展的優勢

不同 ICT 設備 在有特殊需要幼兒各方面發展的優勢	* 平均分		
	ICT 設備及軟件	輔助技術設備	網絡資源
認知發展	3.94	4.24	3.53
社交及情緒發展	3.65	3.65	3.24
語言發展	3.65	3.76	3.41
感知發展	3.06	3.18	2.75
自理能力	2.41	2.71	2.41
大肌肉發展	2.24	2.76	2.41
小肌肉發展	3.47	3.76	2.94
平均	3.20	3.44	2.96



雖然有很多學者（如：Judge等人，2008；何華國，2006；楊碧珠，2009）也指出輔助技術的效能不單為有特殊需要幼兒提供他們在認知、動作、知覺、自理、社交和溝通等經驗，亦能促進他們各方面的發展。它不單為生理缺損的幼兒提供操弄物件的機會，也讓他們透過使用輔助技術的各種設備，能與環境探索、互動和學習。但是，ICT對有特殊需要幼兒能提供十分優質的學習機會也不容否定（陳儒晰和黃金花，2009）。

特殊幼兒中心運用ICT作輔助教學的實況

從問卷調查中得悉約有94%受訪中心提供ICT作輔助教學，相反6%則沒有。在香港的特殊幼兒中心，除特殊幼兒工作員運用ICT作教學工具外，其他專業人士如：語言治療師、職業治療師及物理治療師等也運用ICT為特殊需要幼兒作訓練。

現今不少學者如：Lunen（2011），Newton和Dell（2011）及Weiss（2011）也強調電子產品對特殊兒的學習有其潛在的優勢，例如平板電腦便可介入和幫助自閉症的孩子，讓他們冷靜下來，而其應用程序也可提升特殊兒的整體發展。

在香港，特殊幼兒中心最普遍使用的電子產品是數碼投影機及數碼相機，而受訪者表示他們的中心均有這兩項設備。從回收問卷也得知特殊幼兒中心購有數碼錄影機及數碼影碟機，其次是投射器螢幕及光碟機。而其他為離子電視、背光液晶顯示電視、音樂播放器等。

ICT在主流教室中被視為學與教的一部份，從而使各課程推行得更容易和更有效（McKeown，2000；黃昱綾，2009），如電腦輔助教學既可用以教導傳統的課程外，也可用以教授較抽象的概念，有效地縮短學生的學習時間及提高學習成效。有見及此，ICT如能融入有特殊需要幼兒的日常課程中，深信對這群幼兒的學習及成長會有更大的裨益。唯從本研究得知，政府極少投放資源以推動特殊幼兒中心把ICT融於日常課程中。

「因資源有限，（本）中心很少將ICT融入課程中……而金錢經常是我們在最新ICT上最常遇到的問題，因為這些東西發展很快，我們沒有足夠的金錢以作購買，而現在所用的也是較舊的……（此外），我們也不太懂得如何把課程融入ICT中！所以索性不用了……」（孔姑娘）

「因為一些教學主題或想法太複雜，而幼兒的能力也有限，在課堂上根本沒有足夠的ICT教材及軟件可作配合。」（丁先生）

輔助技術設備

因著輔助技術對有特殊需要幼兒的幫助，以及隨著ICT的不斷發展和進步，運用輔助科技以提升有特殊需要幼兒的學習及生活能力，已是特殊教育一個不可或缺的發展方向（Judge等人，2008）。從本研究得知，約多於50%的特殊幼兒中心相信他們的輔助技術設備是尚算足夠的，如受訪者表示：

「在我中心內的輔助技術設備亦算足夠，例如我們會把一些玩具加以改裝為電動玩具，使我們的幼兒更容易操控那些玩具和有興趣地玩耍，令他們從中獲得更大的裨益。」（孔姑娘）

「因為政府的資助並不多，在缺乏金錢下，我的中心內的輔助技術設備並不多……希望政府可資助購買如平板電腦，因為平板電腦較一般電腦易於操控，小朋友在較易掌握下，可令他們的學習效能得到提升。」（丁先生）

多感官器材

如前文所述，一些多感官器材漸為特殊幼兒中心使用。唯這些器材造價非常昂貴，使不少香港的特殊幼兒中心無法購置不同的感官器材以訓練有特殊需要的幼兒。

「在慈善機構的贊助下，我的中心也購置了幾款多感官的器材，如五彩泡泡柱、彩色水晶球、聲控霓虹箱等……因金錢關係，我的中心未能設置一間多感官室，只能把那幾件多感官的器材放在其中一個課室的櫃內，當使用時才拿出來。」（孔姑娘）

「因多感官器材很貴，我的中心並沒有這些器材，對中心幼兒來說，着實可惜……所以我們希望有一個設備十分完善的多感官用途室，因為這些設備對幼兒的刺激是十分有效，他們是十分需要的。希望政府能夠分配更多的資源用於購買和保養。」（丁先生）

雖然多感官課程能讓有特殊需要幼兒的自信、專注力、觸角反應、四肢協調、身體平衡和自我觀察能力得以提升，並能與照顧者建立良好的關係（Kwok, To 和 Sung, 2003；蘇昱堃、王欣宜和柯玉真，2012），唯香港政府沒有投放太多資源在學前特殊教育的 ICT 上。正如丁先生表示：

「ICT 確實對孩子的發展及學習有一定的幫助……我始終認為人與人之間的溝通及互動是最重要的，而小朋友的成長及學習只單單倚賴資訊科技的話，我認為是絕對不可以的，所以我們中心的課程不會太多連繫在資訊科技上，而只會着重透過老師與孩子之間互動，並且孩子間的相互溝通、遊戲和學習，讓他們的发展更全面。」（丁先生）

電腦軟件及網絡資源

現時，香港的特殊幼兒工作人員及治療師會運用不同的電腦軟件作為輔助教學的工具。最常用的應用軟件包括簡報、相片編輯及網頁設計等。研究指出電腦軟件內的互動性多媒體遊戲能提供豐富示範及問題，將抽象概念明確呈現，並能提供適切性學習和回應以提升幼兒學習（高豫，2003）。

「對現時的電腦軟件，我大部份也不會用！而我只會用 PowerPoint 來上課，目的只是吸引小朋友學習，因為我會插入很多有豐富色彩的動畫公仔在 PowerPoint 內，他們見了很開心，而且亦會留心多了，增加了上課的氣氛，使學習成效也提高了。」（孔姑娘）

網頁能在特殊幼兒中心的服務上提供有效的資料，對於中心同工、幼兒及家長而言是一個很好的溝通橋樑。而 71% 的香港特殊幼兒中心設有網頁、29% 則沒有。雖然在特殊幼兒中心內運用網絡資源，能提升中心同工、幼兒及家長在教與學的質量，唯研究結果顯示大部份特殊幼兒中心沒有提供網絡資源予幼兒作學習用途，而其中只有約 12% 的特殊幼兒中心提供線上的資訊給幼兒作搜尋及瀏覽之用。從訪談中，孔姑娘及丁先生也指出：

「在課堂裏，因經費的問題，我們沒有提供互聯網服務，而幼兒也只是有限度地使用教育軟件。」（孔姑娘）

「……我的中心並沒有為幼兒提供互聯網服務，而互聯網只是為同工而設，幫助我們備課或搜集資料。」（丁先生）

香港政府（香港特別行政區政府，2010）在 2010-11 年的財政預算案中承諾會為有需要學童提供合宜及方便的互聯網學習機會，除提供上網津貼外，政府當局亦發放津貼予中小學校以鼓勵推廣 ICT 有關的項目與設施予有需要學生。由此可見，政府亦深信互聯網學習對學童的重要，唯這些恩惠只惠及中小學，而學前教育及服務如特殊幼兒中心則欠奉。

總結及建議

着實，ICT 的發展和運用，對所有幼兒（包括有特殊需要的幼兒）之生活同樣重要（陳儒晰和黃金花，2009；Hutinger 等人，2006）。從以上討論可見，香港的特殊幼兒中心普遍對 ICT 的應用態度是十分支持，更漸漸把以往的



教育模式由「灌輸知識」改變成「啟發知識」。

儘管如此，香港的特殊幼兒中心在教學上使用ICT以輔助教學是有限的，大部分的軟件、電腦、投影機和數碼相機都被歸類為基本的技術，即使差不多一半的特殊幼兒中心也認為輔助技術設備是充足，但發現只有當中的五分之一較普遍用於教學上。雖然不同的ICT和教育軟件都被用以滿足不同有特殊需要幼兒的個別化學習和需要，但他們很少提供幼兒使用互聯網的機會。

為了讓有特殊需要幼兒得着ICT的裨益，從而促進他們的學習及發展，本文作者建議：

- 香港政府應增加撥款以資助特殊幼兒中心購買更多及更多元化的ICT和輔助教學設備，使每個教室也可提供適當數量的ICT工具（如提供互聯網服務和平板電腦等），從而讓學與教推行得更有效。
- 香港政府及特殊幼兒中心應提供更多與ICT並輔助技術工具相關的講座或研討會予中心的特殊幼兒工作人員及治療師，好讓他們透過不同的專業培訓，能獲得最新的知識和技術。
- 香港政府須增加對特殊幼兒中心同工的支援，例如聘請代課老師，以讓中心的特殊幼兒工作人員及治療師能持續參加與ICT並輔助技術工具的相關培訓或研討會。
- 香港的特殊幼兒中心須在教學中把ICT結合於遊戲（冼權鋒、何福全和許令嫻，2003），並設計相應的教學軟件以針對有特殊需要幼兒的興趣和需要，從而為他們提供適切及不同的教學策略之輔助工具。

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科技於幼兒園的應用 — 行政、評量、教學

Technology Integrated into Early Childhood Education: Feasible Approaches for Administration, Assessment, and Curriculum

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摘要

本文在幼兒園行政、評量、教學方面提出應用建議。在行政方面，科技可以應用於對外之行銷與親師溝通，以及對內之組織溝通與知識管理。在評量方面，科技的記錄與統整功能可用於教師評分與幼兒評量，以瞭解幼兒的成長趨勢、判斷如何改進教學或給予幼兒協助。科技是教師教學的利器，也是幼兒的學習工具。教師可在課程中融入科技，培養幼兒的關鍵能力。本文期望發揮拋磚引玉的效果，激發更多的科技應用巧思。

Abstract

To better integrate technology into the field of early childhood education, this article suggested feasible approaches from three aspects: administration, assessment, and curriculum. For administration, this article suggested how technology can be used in marketing, parent-teacher communication, organizational communication, and knowledge management. For assessment, how technology can be used to assess child development was discussed. In addition, practical assessment applications were introduced. Finally, this article discussed how technology can be integrated into teaching to promote language development and creativity which are critical for individuals' future success and adaptation.

引言

科技正逐漸改變我們的生活方式。以前我們看報寫信，現在則是看影音新聞或在 Facebook 發文按讚。筆者在幼兒教育系任教，一直從事科技應用方面的研究與教學，在與幼兒園教師或幼教系學生的互動中，常發現他們在生活上或許已經智慧型手機不離身，隨時上線，但談到把科技應用到幼兒園，則顯得有些疑惑，或是直言沒想到可以這樣用。科技在幼兒園的應用似乎是落後於生活上的應用。有鑒於此，本文由幼兒園行政、評量、教學三方面提出建議。這些建議有些是實務界的應用案例，部分則是植基於學術界的研究成果。本文期望能發揮拋磚引玉的效果，激發更多的應用巧思與創意。

用現成的科技降低溝通成本

在幼兒園經營方面，我們可應用科技迅速的傳播訊息。而傳播訊息時，我們應該思考該利用甚麼管道？傳遞甚麼內容？給哪些對象？(Lasswell, 1948)。依對象區分，我們可以應用科技將訊息傳遞給顧客，發揮行銷與親師溝通的功能，或將訊息傳遞給組織內的成員，發揮組織溝通與知識管理的功能。在傳遞管道方面，有些幼兒園會投入預算請專人設計幼兒園網頁或線上管理系統，讓教師上傳教學日誌、教學計劃以及教學成果，方便幼兒園對外行銷或對內管理。本文則推薦幼兒園應用現成的科技以降低資訊傳遞的成本。



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幼兒園對外之行銷與親師溝通

最好的行銷就是教育品質，品質好自然有口碑（邱淑惠、莊世潔，2009）。但如果能將優質的教學成果對外公佈，口碑的累積會更快速。台灣有一所知名的幼兒園就定期將課程記錄剪輯成精彩的短片，在幼兒園的網站公佈，讓外人了解幼兒在該園如何探索學習，以營造優質的教學形象；另外，該園也將部分只適合對園內家長公佈的教學紀實影片或照片設定成需要密碼登入才可觀看。這種資訊公佈的方式，需要潛在顧客或家長前往幼兒園的網站搜尋。但如果能將訊息主動送到家長或潛在顧客

的手中不是更好？

Facebook 與 YouTube 的整合應用即可讓訊息的傳達更靈活。Facebook（以下簡稱FB）屬 Web 2.0 的產物（林東清，2010），幼兒園不但可以利用它公佈訊息，還可以把訊息直接傳遞到好友（潛在顧客或家長）的手中，並與好友立即互動，這是傳統網頁無法做到的功能。家長與潛在顧客不常看幼兒園的網頁，卻經常回應 FB。為了兼顧對外宣傳以及保護隱私的要求，本文建議如圖 1 的使用方式。



圖 1 利用不同層級的FB分享教學成果

幼兒園可以設立兩種不同層級的FB專頁，包括：幼兒園FB與班級FB（圖1）。幼兒園FB的目標是行銷，有興趣的人，包括家長與潛在顧客，皆可加為好友。在此專頁中，幼兒園可挑選適合公開的教學影片先上傳至YouTube，再轉貼至幼兒園FB，以發揮宣傳效果。這樣做有兩個好處，首先YouTube是公開的分享園地，只要影片的關鍵字設定多元，全世界對此關鍵字感興趣的人都可看到，可擴大宣傳的對象。其次，YouTube影片連結轉貼至幼兒園FB後，所有的好友都會收到此訊息，可達到主動傳送訊息的好處。而且，幼兒園要舉辦任何公開的招生或親子活動都可在此公佈訊息，當好友按讚時，好友的好友也可收到活動訊息，可讓訊息散佈得更廣。

班級FB的目標則是親師溝通，納入的好友要有所限定，只讓園長、行政人員、教師和現任家長加入（圖1）。當然，也可擴大範圍讓已畢業幼兒及其家長加入。比較需要維護隱私的親師溝通、班級事務、學習成果紀實可在此公佈。在班級FB中，教師可以為每一屆的班級設立一個秘密社團，在秘密社團內所公佈的訊息只有社團成員才可觀看。這樣過去已畢業的幼兒及其家長也可繼續做為好友，不會影響現任班級的隱私。最後要強調的是互動功能，家長可回應FB訊息能提高家長的參與度。曾經有位教師因班上突然有腸病毒案例必須停課，在FB通知家長後，家長立刻在FB上分工合作，主動協助打電話給尚未看到訊息的家長，並在FB上討論後續應變的方式（童巧雯，2013）。因此，班級FB也是家長間溝通的園地，讓家長與家

長、家長與教師的關係更緊密。

幼兒園對內之組織溝通與知識管理

雲端科技讓資訊可以多人共享、使用者可以隨時隨地用任何網路裝置存取，且更新時資訊可以同步化 (Weiss, 2007)。在此分享台灣一所小型優質幼兒園使用雲端科技 Google 行事曆進行組織溝通，以及應用 Dropbox 雲端硬碟進行知識管理的案例。

領導由溝通開始 (Barnard, 1968)。案例幼兒園經由 Gmail 帳戶設立兩個層級的 Google 行事曆，一個是全園行政行事曆，另一個是班級教學行事曆。行政行事曆設定為全園教師可以共同編輯、觀看的模式。如此，誰要請假，哪一個班級要校外教學，教師可以自行上網填入。因為資訊立即更新同步，所以全園教師上網看到的都是最新的行事曆。當事後想安排新的活動，例如有家長想預約參訪，只要看看行政行事曆即知有無空檔以及是否有足夠的人力接待。班級教學行事曆則是設定為班級內的兩位協同教師可共同編輯觀看。園長則可以觀看所有班級的行事曆。如此，園長可隨時瞭解教師的教學進度安排，進行後續管理。

知識管理是指收集、整理、轉化、創造、保存、傳播和利用知識，讓知識成為學校的資產，提升學校效能 (吳清山, 2001)。在幼兒園，知識管理包括將教師的優質教學資源和成果予以保留並加以分享，讓其他教師有觀摩的機會，這類資源對新手教師的專業成長格外重要。此時雲端空間即可做為教學資源分享平台。案例幼兒園也設立兩個層級的雲端空間，包括：全園共享以及班級共享之教學資源空間。行政人員或園長蒐集篩選歷年的優質教案或教學成果分類建檔於全園分享空間。教師設計教案尋找資源時可以到此空間尋找優秀案例作為參考。班級分享空間則是兩位協同教師將教學記錄、教學規劃、教學日誌等教學事務相關檔案儲存於此，可共同編輯更新，園長則可隨時審閱最新紀錄，進行後續管理。

前述案例的幼兒園規模較小，園長身兼教學工作，為了降低行政負荷，因此採用比較分權的資訊管理方式。這種分權的管理方式是否適合規模較大的幼兒園尚待研究。規模較大的幼兒園或許可修改編輯行事曆或雲端檔案的權限以加強對資訊的控管，例如，行政行事曆的編輯權限可以設定成只讓教師觀看而無法自行編輯，由行政人員統籌溝通後編輯。

善用科技的特性進行評量

教師要瞭解自己的教學成效和幼兒的能力有賴定期評量。在台灣，教師是否確實執行評量已納入幼兒園評鑑。但筆者發現教師經常沒有針對評量結果進行後續處理，因此無法由評量結果看出幼兒的成長趨勢，也就無法判斷該如何改進教學或給予幼兒哪些協助，喪失評量的意義。筆者推斷原因，可能是資料的紀錄與分析需要時間投入，導致工作繁忙的教師無法兼顧，此時善用科技的記錄與統整功能即可解決此種困境。本文將評量概分為教師評分與幼兒評量兩種，分別提出建議。

教師設定評分準則

教師評分是指教師自行設定評分項目、準則，由教師觀察幼兒的能力或行為後填入分數。現在的行動裝置可以下載評量學生專用之 APP。例如：Easy Assessment, GradePad, Teacherkit, Student Profiles 等等。應用行動裝置搭配這些 APP，讓教師可以在觀察幼兒操作教具、工作或遊戲時，隨時記錄觀察結果。例如，利用 Easy Assessment，教師可以事先設定語文、認知、社會、情緒、美感、身體動作與健康等六大領域的評分向度，在每一向度下再設定數個評分準則，如：語文之下有「能介紹自己的作品」準則，並自訂給分範圍，如在 1 到 3 分中，1 代表無法清楚描繪，2 代表能描繪但條理待加強，3 代表能有條理的表達。如此，教師可以在幼兒自由探索或角落工作時，走動觀察並輕鬆的在行動裝置上輸入評分。這些記錄可以匯出成 Excel 檔直接上傳至 Dropbox。教師可以統計幼兒在各領域的變化趨勢，瞭解幼兒的特長與需要協助之處。除了量化的評分外，

教師也可利用 Student Profiles 製作電子化的檔案評量，結合幼兒的作品照和老師的文字敘述記錄幼兒的成長。這些質性描繪記錄可作為教學安排或親師溝通之依據。

依幼兒的表現評量

幼兒表現評量是指分數的評定需要幼兒完成指定任務，依幼兒的表現評分。這種評量方式比教師評分更為客觀。缺點是幼兒接受評量的經驗不多，面臨過於抽象的評量情境，可能因不瞭解作答目標而無法展現能力。科技可用以改良傳統測驗過於抽象或計分不易的缺點。例如，應用科技在評量中加入幼兒作答後立即得知對錯的回饋，可讓評量遊戲化，幼兒也較能了解該如何回應問題 (Chiu, Alexander, & Tsai, 2013)。商業化的學習軟體大都會在學習單元之後，加入這種提供對錯回饋的遊戲式評量。

近年學術界也有許多應用科技開發出的評量工具。在認知方面，Chiu et al. (2013) 以連連看的方式，先給幼兒一個圖像配對，例如：「鳥：鳥巢」，讓幼兒選擇「狗」該與甚麼配對，藉此評量幼兒的類推能力。在語文方面，邱淑惠 (2012) 的幼兒語文能力評量系統，利用圖像與事先錄製好的語音，在遊戲式的情境下測驗3-6歲幼兒的語文能力，幼兒作答後施測者可立刻查詢幼兒的語文評量成績。在感覺統合方面，台灣的研究團隊開發動作辨識系統，可在幼兒做完指定動作後，診斷幼兒的感覺統合發展 (Lin, Wu, Kuo, & Li, 2010)。這些努力的目標都是希望以更精確、簡便或有趣的方式評量幼兒的發展。

應用科技創新教學

科技不但是教師教學的利器，也是幼兒學習的工具 (邱淑惠, 2010)。科技應用於教學領域，可由老師教、學生學兩方面來談。近年來有許多學者，嘗試開發幼兒使用的學習工具，並提出教師可以在課程中融入該工具的課程模式。因此，本文也分享在科技應用方面嘗試整合老師教與幼兒學的例子。

教師應用科技教

在教學方面，教師最常用科技傳遞知識，利用多媒體呈現教學內容，讓幼兒能看到平常不容易看到的畫面，例如，蝴蝶如何破蛹而出。除了知識的傳達外，科技也可用於培養幼兒的觀察力，例如，教師提供一個近拍花粉的畫面，讓幼兒猜猜看那是甚麼，引發幼兒以不同角度觀察事物的興趣。科技也可以用來活潑教學內容，有一位老師在說故事時以 Power Point 呈現繪本的畫面，當說到大野狼用力吹房子時，適時轉換呈現房子倒塌的畫面，讓故事更生動。科技也可以用於記錄孩子的學習過程，有位老師在課程中鼓勵幼兒自創呼啦圈的各種玩法，並拍攝下來，在課堂播出時幼兒興奮的看著自己發明的玩法，也觀摩他人的創意。綜合而言，教師應用科技教學方面的實例繁多，在各個學習領域都能看到創意。

幼兒應用科技學

生活中常看到幼兒霸佔家長的手機玩遊戲。現在的行動裝置有許多專為幼兒設計的軟體，幼兒可在操作中學習。但過分強調知識背誦、重複練習的軟體，或許能滿足家長的期待，對幼兒的吸引力是短暫的。好的軟體應該要讓幼兒從中探索、創作、與人溝通或解決問題，讓幼兒能在遊戲中培養適應社會的關鍵能力 (邱淑惠, 2005)。在此以兩個能培養創意與表達能力的APP說明。

Doodle Cast for kids 是一個能「話畫」的APP，其特殊之處在於幼兒能邊畫邊說話，而整個筆觸移動的過程與說話聲音會被記錄成影片，完成後也可上傳至 YouTube。應用此APP創作可以盡情發揮想像力，幼兒可邊畫邊解釋自己的畫、用畫說故事、或畫出自己的祝福作為電子賀卡，家長也可與幼兒共同創作，在畫畫和說話上分工。這樣的創作空間，搭配過程可以公開的成就感，可以讓幼兒樂於創作，在創作中練習表達溝通。

My Storybook 是一個能讓幼兒看圖說故事的 iPad APP。與 Doodle Cast 相同的是它可以讓



幼兒創作故事，或進行親子合作的創作，不同的是，幼兒不用畫圖，只要拍照選圖，然後為每張照片錄下自己的故事，完成後就是一本電子書。戶外教學或家庭旅遊時，幼兒也可为自己的生活照或觀察照加上口語旁白，製作自己的旅遊日誌或觀察記錄。

在課程中讓幼兒用科技創作

幼兒雖然可以由操作軟體的過程學習，但缺乏成人循序漸進的引導，成長空間有限（邱淑惠，2008）。近年來學者嘗試研發可與課程結合的學習工具，並提出與課程結合的教學模式。或許是考量3-6歲幼兒正適合發展口語表達能力（Wasik & Newman, 2009），許多學者開發的工具，其共通點都是讓幼兒說話或說故事。這些學者相信，教師在課程中融入說故事的活動，可以讓幼兒由應用中瞭解語詞的功用，增進口語表達能力。

例如Mini Web, Multilingual, Maxi Learning (MMM) 團隊開發3-7歲幼兒專用之溝通軟體，讓幼兒能與異國的幼兒透過文字、相片、繪圖與聲音溝通，經由溝通學習多種語言並瞭解語文的重要（Cohen, 2005）。Cassell和Ryokai（2001）設計一個含有無線傳輸的毯子，搭配玩偶場景，讓幼兒玩扮演遊戲，過程中說故事的聲音、玩偶經過的路徑都可以記錄下來事後撥

放，讓教室中的扮演遊戲與說故事活動結合起來。

Chiu & Koong（2009）調查教師和幼兒的需求後，開發一個幼兒能自由選擇圖片，搭配口述錄音的故事創作軟體MyStory（My Storybook的PC版）。MyStory可讓老師匯入與教學主題相關的圖片讓幼兒作為說故事的題材。台灣有多位幼兒園教師在教室中營造一個電腦角，做為幼兒創作故事的角落（邱淑惠，2010）。由他們的經驗發現，經常進入角落創作故事的幼兒其口語表達能力有明顯的增進（黃惠雯、邱淑惠，2009），學者並進一步提出融入故事創作活動之可行模式供幼教老師參考（邱淑惠、黃惠雯，2010）。

總結與期許

在工業革命之初，電視、冰箱等是科技產物，但在今日則是家庭必備用品。電腦、智慧型手機等在今日是科技產物，但已是部分人口的生活必需品。因此，所謂的科技，其特點可能是「新」。因為新，所以科技在幼兒教育的應用還有待開發。本文由幼兒園的行政、評量、教學三方面提出應用建議，期待以此激發出更多的構想，讓科技在幼兒園的應用能更加活潑與彈性。

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善用數碼社交網絡促進幼兒機構行政管理 Use of Digital Social Network in Preschool Management

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摘要

隨著各式各樣的數碼社交網絡平台的出現，如臉書 (Facebook)，微博 (micro-blog)，微信 (Whatsapp) 等，令人們的溝通方式及社交生活起了巨大的轉變。本文的目的為瞭解幼兒機構的領導者應用數碼社交網絡的現況，並探討社交網絡在幼教行政管理的應用可行性。此研究利用問卷調查方法探討幼兒機構領導者的應用現況，發現大多數幼兒機構的校長主任經常使用臉書和微信與親友溝通。最後，本文提出對幼教行政管理工作應用數碼社交網絡的策略性及可行性建議。

Abstract

Digital social network becomes one of the major ways to communicate and share information with friends and families, samples of some popular social networking tools are Facebook, Micro-Blogs, Youtube and Whatsapp. This study aims to understand the use of digital social networks by preschool leaders in Hong Kong and to explore some possible usages of social networks in preschool management. A survey was adopted, and the survey results have identified that many preschool leaders use digital social networks for personal communication, Facebook, Email and Whatsapp are the most popular ones. Further practical uses of digital social networks are suggested for preschool management.

引言

數碼社交網絡漸廣泛被應用，尤其普遍被年青人用作溝通聯繫的工具。近年，許多商業機構也利用社交網絡平台作為推銷產品用途，甚至政治人物也利用這些網絡平台宣傳政治訊息。可見數碼社交網絡用途廣泛，成效也收到廣泛的認同。張琬翔 (2010) 指出網際網絡的四種優勢：包括資訊共享性、人際互動性、傳播即時性、與內容多樣性。有研究指出數碼社交網絡在學習或工作上均具正面影響 (Gifford, 2010; Laru, Naykki, & Jarvela, 2012)。筆者相信幼兒教育機構也可運用數碼社交網絡促進學校行政管理，尤其訊息推播行銷及意見反饋交流。本研究旨在探討幼兒機構領導者應用數碼社交網絡的現況，從而提出具體建議善用數碼社交網絡的策略及可行性。

社交網絡與學校管理

「舊城牆的防護措施與限制出入的管理方式正漸漸消失，目前我們可以看到一股新的力量。世界越來越寬廣，未來的領導人也懂得開始抓住各種機會，於舊有的障礙與界線瓦解之處建築起新的社群……合作關係正建立一個公開溝通的新秩序。」(杜拉克基金會，2003，頁26)。這十年前的陳述預警，隨著互聯網的普及與發展，近年的持續進步使人類的溝通趨向更互動更多元化。由初期互聯網時代的被動式、順序式和資訊式年代，已踏入現在的互動式、高速式和多元式。人類利用互聯網及通訊科技的高速發展轉變，令溝通連繫走進數碼社交的網絡環境。維基百科說明社交網絡「主要作用是為一群擁有相同興趣與活動的人建立線上社區。這類服務往往是基于網際網路，為用戶提供各種聯繫、交流的交互通路，如電子郵



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件、即時消息服務等。此類網站通常通過朋友，一傳十十傳百地把網絡展延開去，極其類似樹葉的脈絡」。隨著各式各樣的數碼社交網絡平台的出現，如臉書 (Facebook)，微博 (micro-blog)，微信 (Whatsapp) 等，令人們的溝通方式及社交生活起了巨大的轉變。數碼社交網絡成了炙手可熱的社交工具，也成為社會中各個人群的互動平台。

哈佛商學院教授碧士高斯基 (Mikolaj Jan Piskorski) 指出社交網絡創造了傳統世界中不可能出現的情況，就是能夠隨時隨地輕易快速地掌握一群遠近朋友家人的近況，對人群關係的商業活動和學習行為深具影響 (Piskorski, 2013)。史提芬•杜斯 (Stephen Downes) 於二零一零年提出第二代的電子學習年代 (e-learning 2.0) 促使網絡溝通在非正規教育上廣泛被應用，如網絡日誌、維基信息等 (Downes, 2010)。

學校管理著重效率和效益，對人、事、物、財均需以高效能的行政手段去策劃統籌，務求達至學校管理目的。正如教育管理學專家謝文全 (2002) 指出學校行政是對學校教學以外的事務作系統化的管理，以求有效又經濟地達成教育的目標。由於學校機構的持份者眾多，包括學生、家長、教職員、辦學團體成員、教育局督學，因此學校行政管理中最重要且最複雜的就是跟人事相關的管理。不同人事所涉及的管理策略方法也不盡相同，如能在人事管理方面能人盡其才、團結互補、減少磨擦和發揮潛能，學校的工作推行便會事半功倍。利用通訊科技的進步，數碼社交網絡提供無界限和超速度的聯繫溝通優勢，有助學校管理工作的推動和人員的溝通交流。

研究目的與方法

此文目的為瞭解幼兒機構的領導者應用數碼社交網絡的現況，從而探討社交網絡在學校行政管理方面的潛在用途及應用策略建議。本研究利用問卷調查方法探討幼兒機構領導者的數碼社交網絡應用現況。並以描述性統計法說

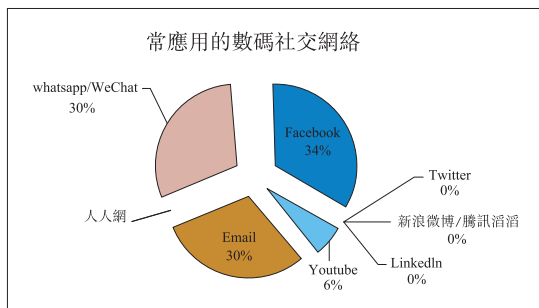
明研究結果，方便集合數據探視結論 (Black, 2001)。調查對象乃是過去五年內曾修讀香港教育學院校長班課程的學員，而所有學員均是任職校長或幼稚園主任，以隨機抽樣方式選出其中兩班作調查。兩班校長班學員共 68 人，問卷以電子郵件方式發出，並鼓勵以電子郵件回覆或以智能手機拍照再用微信 (Whatsapp) 回覆。三天內的回覆率為 29.4%。其中以電子郵件回覆的有 80%，餘下 20% 以微信回覆。問卷內容包括個人資料及其經常使用的社交網絡、使用情況、使用率、原因、用途等等。

研究結果

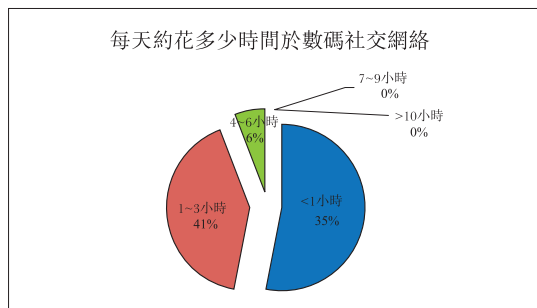
此研究的對象主要是幼兒機構領導者，60% 的參與調查者為幼稚園校長，25% 為主任，其餘 15% 為副校長。參與調查者的年齡組別分佈最多是 45-54 歲 (55%)，其次為 35-44 歲 (20%)，55 歲以上者有 15%，最少的是 25-34 歲組別 (10%)。半數參與調查者認為個人的電腦應用技術達至中級水平 (50%)，只有 5% 的參與調查者認為具備高級電腦應用水平。

25% 的參與調查者在 301 名學生人數以上的幼兒機構工作，而 75% 在少於 300 名學生的幼兒機構工作。關於使用社交網絡概況，50% 表示有使用，而 15% 表示從沒使用任何數碼社交網絡，另外 35% 則表示很少使用。圖表 1 展示參與調查者較常使用的三種數碼社交網絡，最多人使用的是臉書 (Facebook) (34%)，其次為微信 (Whatsapp/ WeChat) (30%) 和電子郵件 (30%)。有使用社交網絡的參與調查者中，71% 表示經常使用或常使用，29% 則表示偶然或很少使用。53% 有使用社交網絡的參與調查者表示每天約花少於一小時使用數碼社交網絡 (圖表 2)。關於較少使用社交網絡的原因，59% 表示沒有時間 (圖表 3)。圖表 4 顯示 34% 的使用者較多應用於聯絡親朋之用。其次是學校用途 (32%)，顯示領導者漸多使用數碼社交網絡於學校工作上。圖表 5 顯示 70% 使用者較喜愛於晚上使用社交網絡。

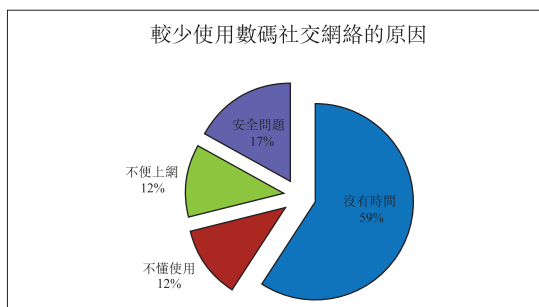
圖表 1



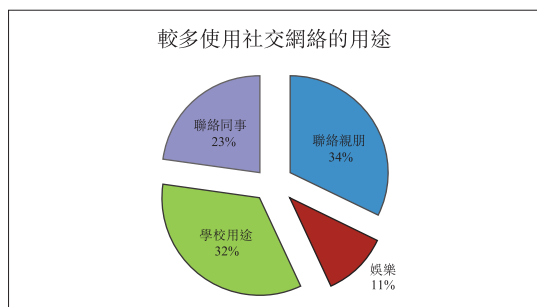
圖表 2



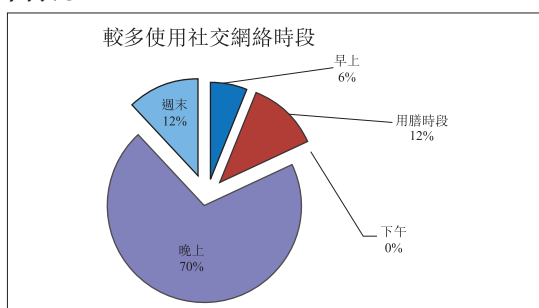
圖表 3



圖表 4



圖表 5



在開放式問題中，有參與調查者表示數碼社交網絡不如實際社交聯絡，「……用電話連繫還可以聽到對方的聲音，感受對方的喜怒哀樂，透過網絡文字及表情符號，感覺是冰冷的」。也有參與調查者表示應用數碼社交網絡帶來前所未有的便捷，「同一時間可以聯絡整個群體，傳遞訊息方便快捷」。有參與調查者更舉例說明她曾透過手機發訊息予家長，提醒家長出席學校活動，並認為這方法既具效率又簡單方便。

討論及建議

縱觀此項調查的幼兒機構領導者，佔半數已超過 50 歲以上，但只有 15% 表示沒有使用數碼社交網絡，顯示大多數幼兒機構領導者均具備使用數碼社交網絡的技術與經驗。使用者中 34% 表示較常用的是臉書 (Facebook)，可見臉書比較簡單易用，普及性頗高。微信 (Whatsapp) 和電子郵件均有 30% 的使用者。市場上越多人群的使用，可越發影響更多群體加入應用，普及率越提升，流通性更廣泛。正因為這些數碼社交網絡不難使用，且趣味性豐富，使得不同年齡階層的人士也樂於應用。



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從幼兒機構領導者的社交網絡使用情況而言，53% 表示每天只花少於一小時使用，且有約三成表示只是偶然或很少使用。這也從另一個方面體現幼兒機構領導者的工作繁重，尤其近年不斷轉變中的教育政策、專業要求、評估考核等等，令幼兒機構領導者需持續提升專業水平，工作量不斷增加。而使用社交網絡者中，34% 表示用於與親朋聯絡方面較多，顯示網上社交群組的連繫主要以非工作類別為主。既然數碼社交網絡應用性漸普及，平板電腦和智能手機亦具多元化功能，本研究亦發現大多數幼兒機構領導者（85%）曾使用社交網絡，更有幼兒機構領導者表示社交網絡有利「傳遞訊息方便快捷」。筆者認為如加以發揮創意，善用數碼社交網絡於學校行政及人事管理方面，強化溝通聯繫，可以有助提升工作效率。

從研究數據中看到85%的幼兒機構領導者日常已使用數碼社交網絡，因此筆者對善用數碼社交網絡在學校行政管理工作的建議如下：1. 互動分享（學校喜訊、趣聞、休閒式聯誼等）；2. 群組合作（群組創作、分級會議、家長意見搜集等）；3. 訊息傳遞（學校工作宣傳、家長活動通告、衛生健康資訊等）；4. 監控管理（網上論壇快速回應、教職員工作流程管理，如請假通知、危機管理並即時處理應變等）。

互動分享

顧名思義，社交網絡就是利用互聯網進行的一種社會化交流的人際網絡，人們通過訊息科技彼此分享互動。幼兒機構領導者可跟教職員或家長即時交流心得感受，作休閒式聯誼拉近彼此關係。以輕鬆手法分享有關學校的喜訊，如獲得某些獎項或某教師將要結婚等。大家亦可分享對某事情的觀點和發表個人意見，如抗癌防疫健康有益食療資訊或增進家庭和睦的方法。藉著一些非正規、較輕鬆的網上交流促進溝通和分享，以軟性手法增強彼此連繫。作為領導者，首要工作其實是促進關係，彼此加強認識聯繫，以致日常工作更易表達大家的意見，較易獲得支持諒解。

群組合作

學校的工作總離不開會議討論，以往必須所有教師聚集一起商議，得先找到大家都方便出席會議的時間，再共同討論計劃。現在可先利用臉書、微信或電郵，作前提討論或「腦激盪」交流，領導者能獲得初步意見作基礎，有利仔細策劃，也省略開會時間。同樣，學校內的其他群組也可開通組織小組討論區，如不同級別教師，課程發展小組等，都可利用社交網絡工具作緊密交流，甚至獲取結論省卻開會安排。

群體共同創作亦可利用社交網絡工具發揮大家的創意和合作。比方說高班老師們一起創作兒歌、遊戲活動、課室設計或故事書集等，你一言我一語在臉書內的特定群組提供意見並共同修訂創作，如能提高參與的積極性，可以很大程度上提升工作效率，且別具合力創造的團結意義。

學校的合作層面不能缺少家長的部分，尤其幼兒教育工作，家庭與學校的合作息息相關。科技的進步帶來家庭與學校更緊密的聯繫溝通機會，有賴幼兒機構領導者把握多元化的交流渠道。正如學校一般均有的家教會、分班家長團體或各班家長代表等組織，學校文書人員可於學期初，預先輸入各類家長組織的成員電郵地址或手機電話號碼於常用的社交網絡群組內，日後方便溝通聯誼和分享合作。

訊息傳遞

學校經常需要發出大量資訊予相關持份者，也要定期宣傳學校各種項目或成就。從臉書近年增添各式各樣的商業廣告，可想而知宣傳效果不錯。幼兒機構領導者可發揮創意，設計合適的宣傳訊息文字圖片或視頻，無論展示於臉書或優酷（YouTube / Youku），均可鼓勵其他人說「讚」，或寫下留言分享。最重要是在朋友或閱讀者的圈子內再被傳遞，訊息轉發以倍數增加，免費宣傳果效立竿見影。



學校自行統籌開展的臉書平台是一免費推廣學校近況的好地方。發佈最新校園資訊，家長活動通告提示，甚至按天氣轉變情況通佈，已申請病假兒童數目，或發放衛生健康資訊，這些都能讓家長及公眾加深瞭解學校運作，增加透明度。訊息傳遞在每年初開學時尤為重要，尤其新生家長們，他們既擔心孩子的適應進展，又不清楚學校的實際情況。故此，幼兒機構領導者可主動宣揚更多新生入學資訊，初上幼稚園的父母須知等，並鼓勵有經驗的父母分享交流心得，解答新手家長的疑難雜症。此類免費網上交流平台可成為學校訊息宣傳的工具。但香港的幼稚園宜注意不同地區或國家所使用的社交網站有所不同，如臉書不能在內地普遍使用！因此，服務跨境兒童的幼教機構注意使用合適社交網站。

監控管理

現今作為學校行政人員，不能單純在學校圍牆之內工作，也要跨越界限從虛擬世界獲取有關學校的情報資訊和瞭解家長對學校的相關觀點，方便加深對客戶群（現有家長及未來家長）的關注需求瞭解。因為現代的家長喜愛將自己對學校的疑問和期望，先從互聯網的討論區中找尋答案，同時亦發表個人觀點。所以，幼兒機構領導者宜在社交網絡中進行觀察關注，留意有否任何針對校方的言論，並快速地作出適度的回應。假如有任何誤解或惡意消息散播，校方可作出適當解說或修正謬誤。同樣，也可從中認識家長們的祈盼和需求，從而作出適切調節。故此，幼兒機構領導者在社交網絡上宜定期的監控管理，瞭解公眾人士的意見，知己知彼，並明確申述校方相關政策或立場。

監督控制的工作實在是行政工作之一，也是危機管理的一部分，日常的監管督導能有效預防危害或隱患。例如阻止網上謠言散播，影響學校形象。同樣，如天氣變化不定，遇上紅色暴雨警告或三號強風訊號，除可在學校網頁發佈停課相關資訊外，也許社交網絡會更快速發佈相關停課安排訊息，因為多數人已將主要應用的社交網絡置於智能手機，新訊息即時傳遞，效率更佳。

結論

幼兒機構領導者可適當運用社交網絡促進校內外人士的聯繫和合作，視之為其中一種溝通工具。凡有助提升學校行政管理效率的方法，領導者均可慎重選擇並加以應用。既然現今科技進步迅速，人與人的相處和溝通也可運用數碼社交網絡的優勢加以增強，而領導者也可運用多元化溝通工具促進有效的管理。謝文全（2006）認為學校行政管理是帶動學校邁向目標與改革進步的火車頭，要改善教育就須先改進學校行政管理。本文從幼兒機構領導者調查所得，八成半的參與者均有使用社交網絡的經驗，如加以適度運用於學校管理工作上，除了可加強人際溝通之外，還可更加節省聯繫的時間。這些都能使學校行政管理有進步。當然，使用社交網絡必須注意私隱性和安全性，且需安排具備相關技術人士進行支持和協助。文中筆者提出多項運用數碼社交網絡的建議作為參考，盼有助於推動創新科技在幼教行政管理上的應用。



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從教育財政視角探討香港幼稚園教育的資助

The Subsidization of Hong Kong's Kindergarten Education from Education Finance Perspectives

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摘要

隨着社會和經濟的發展，要求把學前教育納入免費教育的呼聲日高。本文旨在從教育財政的角度討論在提供十五年免費教育的呼聲下，資助香港的幼稚園教育的問題。把幼稚園教育涵蓋於免費教育並不是像把九年免費教育擴展至十二年免費教育般簡單。將會涉及幼稚園校舍的機會成本、教職員編制、薪酬機制以至幼稚園教育市場運作方面的問題。文中亦提出從財政津貼和稅項補貼及扣減的角度，以舒緩家長在子女幼稚園教育方面的財政負擔，並確保不會有兒童因家庭經濟困難而無法接受優良的幼稚園教育。

Abstract

There has been an increasing demand for extending Hong Kong's free education to 15 years. Actually, the extension of free education to 15 years is not as simple as extending it from 9 years to 12 years five years ago. It will involve the issues of the opportunity costs of using kindergarten premises, the development of a staff establishment system and salary scale for kindergartens and the effects on the market of kindergarten education. This paper attempts to address these issues that may arise from making kindergarten education free, and to suggest possible solutions, in terms of subsidy and tax credit, to ease the financial burden of parents in supporting their children's quality kindergarten education.

引言

社會上不斷有言論提出要香港特區政府把免費教育由十二年擴展至十五年；換言之，就是要把免費教育的涵蓋範圍由基礎教育和高中教育擴展至學前教育。提出這要求的論據是顯而易見的，包括：香港已擠身於發達國家/地區之列；香港政府坐擁雄厚的財政儲備；鄰近地區如澳門亦已實施十五年免費教育；學前教育已不再是一種可有可無的服務，不少家長已視學前教育為有助其子女接受小學教育的必需品；學前教育是兒童接受社會化的一個重要機制和階段等。香港的六年強迫教育和九年強迫教育政策早已分別在一九七二和一九七八年

實施。隨着香港社會、經濟和教育的發展，免費教育也已於二零零八/零九學年推展至高中階段。在這脈絡下，香港教育的發展下一步自然是要把免費教育由十二年擴展至十五年了。要把免費教育擴展至學前教育，是否一如當年把免費教育由九年擴展至十二年的時候，政府只須對公營中學補貼高中學生所須繳付的學費一般？根據財政司的估計，由於在二零零八/零九年起推行免費高中教育的原故，二零零八/零九年度的財政撥款比二零零七/零八的修訂預算只增加了3,290萬元（香港特別行政區政府，2008）。對一個坐擁龐大財政儲備的政府^[1]來說，財政能力以及政策推行時的行政問題，都

[1] 以二零一三年二月廿八日為例，截至二零一三年二月廿八日香港特區政府的財政儲備為7,448億港元（庫務署，2013）。



不成為阻礙推行十二年免費教育的因素。而且當時香港特區政府對公營學校的高中教育已給予大幅的資助，學費佔教育成本不到12%（李錦昌，2007）。然而，對推行免費幼稚園教育來說，可不是一件簡單的事。因此香港特區政府於二零一三年四月八日宣佈成立「幼稚園教育委員會」。該委員會將向教育局就如何切實可行地推行免費幼稚園教育提供具體的建議（教育局，2013a）。

政府對公營中、小學教育的資助

香港特區政府在二零零八/零九學年起把免費教育推展至高中階段時，在公營學校^[2]裡有足夠的學額供學生得以在完成九年免費教育後，繼續完成高中教育。特區政府對公營學校的各項撥款都各有其撥款的依據的。例如不論在中學或小學，都制定了教職員編制的計算標準，教師的薪酬則依照公務員的薪級表，教育局也為學校制定了校舍家具及設備的標準、以及計算各項撥款的基礎（教育局，1994a；1994b；2011；2012）。在計算所應給予學校的資助時，主要是基於各資助學校教職員和學校在家具、設備、以及以開辦班級數目的多寡來釐定的；但使用學校校舍的成本（opportunity cost）^[3]是不會被考慮的。倘若香港政府把免費教育涵蓋學前教育的話，在計算撥付給幼稚園的資助時，是否也可以採用這一種模式呢？

使用校舍的機會成本

現時的資助中、小學，其校舍不論是辦學團體自建的，還是由政府（包括房屋署）所提供的，當政府向其發放津貼時，校舍的機會成本是不在考慮之列的；也就是假設校舍（即使是自建的校舍）的成本為零。甚麼是使用校舍的機會成本呢？那就是該校舍不用作辦學而改作其他用途時所可獲得的最大回報。簡單而言，就是把該校舍出租時所獲取的租金。現時

香港特區政府向公營中、小學發放資助時，所考慮的只是教職員薪酬、家具及設備、教材及教具、學生活動、水費、電費等外顯的營運成本（explicit operating costs），從而計算所給予學校的撥款。由於教育局已為公營學校制定了教職員編制、薪酬以至家具及設備的標準，因此便可以劃一地按班級數目或學生人數向各公營學校發放津貼。然而，當香港特區政府要為學前兒童提供免費的幼稚園教育時，向公營中、小學發放撥款的模式對幼稚園來說是不行的。因為現時的幼稚園（包括非牟利幼稚園）都是私立的，都是開設在私人（包括辦學團體）的物業內；每年租金方面的支出都佔總開支不少的比例。雖然現時教育局對根據《稅務條例》獲得豁免繳稅的非牟利幼稚園發還校舍的租金。然而，這些幼稚園必須符合教育局所釐定有關學費和每名學生每年平均租金的要求，才可向教育局申請發還租金。而且，只有當校舍使用率達50%以上時，才可獲發還教育局認可的全數租金，否則只可獲發還教育局認可租金的一半（教統局，2004）。為兒童提供免費的幼稚園教育時，香港特區政府當然只可以把資助局限於根據《稅務條例》獲得豁免繳稅的非牟利幼稚園，在幼稚園教育形成一個類似資助中、小學以公營來營運的公營幼稚園體系。不過，把幼稚園「公營化」時，使用幼稚園校舍的機會成本便不能置諸不理。在物業價格和租金不斷飆升的情境中，如何能夠公平地和合理地向公營幼稚園在租金上給予資助，而又能夠避免辦學團體誇大使用校舍所涉及的機會成本以謀取得最大的利益？

幼稚園的教職員編制和薪酬機制

除了關乎使用校舍的租金和機會成本問題外，為了在計算撥款時能夠有一個客觀和公平的參照，教育當局便須訂制一個像現時資助中、小學般的教職員編制和薪級表；從而釐

[2] 公營學校指的是由公營營運的學校，包括官立學校、資助學校和直接資助學校。

[3] 機會成本指的是在作選擇時所放棄了最佳的其他選擇（best alternative forgone）（Lipsey & Chrystal, 2011）。也即是說在作選擇時，所犧牲了的最高報酬。



定出教育當局對各幼稚園所應撥付的教職員薪酬資助。以資助中學為例，教育局制定了班級數目和教師的比例、學位教師和非學位教師的比例、學位教師和高級學位教師的比例。而任職於資助中、小學的教師薪酬，按香港特區政府公務員總薪級表設有入職薪級點、薪酬關限、晉升薪級點等。然而，若要在幼稚園教育體系設置一個類似的教職員編制和薪級機制，例如訂定學位幼兒教師和非學位幼兒教師的比例、以至各種資歷幼兒教師的入職薪級點、薪酬關限、晉升薪級點等；這樣做將會在一定程度上，使幼稚園教師感到他們會跟資助中、小學教師一般，在薪酬和就業上獲得跟他們相若的保障。幼稚園教師更有可能認為，政府要為人口變化對幼稚園教師需求轉變所帶來的就業問題負上一定的責任。例如在適齡學童人數下降時，要求教育局避免在幼稚園出現如中、小學般的「縮班殺校」問題。當然，這並不是說政府不應為學前教育的發展作宏觀的規劃，政府因着社會和經濟的發展，進行宏觀的規劃是有需要而且是必須的。然而，在一個以自由市場主導的經濟社會裡，政府要向某個別行業員工的就業作出保證，非有十分強烈的理由是不行的；畢竟香港並不是一個實踐計劃經濟(planned economy)的社會。

教育籌資方式的轉變

幼稚園教育「免費化」可以算是學校教育籌資方式的改變。現時香港所有的幼稚園都是私立的。話雖如此，非牟利的幼稚園可透過「非牟利幼稚園租金發還計劃」(教統局，2004)和「學前教育學券計劃」(以下簡稱「學券計劃」)(教統局，2007)獲得從政府而來的資助。前者在一九九四/九五學年開始實施，以校舍所屬類別和地區、以及錄取學生的人數來計算非牟利幼稚園所可以獲得的租金資助。後者則在二零零七/零八學年開始實施，參加「學券計劃」的非牟利幼稚園可根據入讀兒童的人數向教育局兌現學券，從而獲取從教育局而來的資助；是以錄取學生的人數作為計算資助的基礎。「學券計劃」的目的，是要讓香港所有適齡的兒童均可接受費用合理、質素優良的學前教育。除了這兩項主要的政府撥款外，幼稚園的其他主

要收入便是學費以及茶點費、活動費等。在現行的「學券計劃」下，倘若幼稚園所收取的學費高於學券計劃的資助金額時，家長需向幼稚園支付有關的差額(教統局，2007；教育局，2013b)。

當幼稚園教育轉變為免費教育的話，雖然家長仍須支付兒童在校服、書簿、茶點和活動等方面的開支，但家長已不用繳付學費。基本上，幼稚園的營運可以說主要是由公帑所支持。換言之，它是把私立的幼稚園轉變為好像資助中、小學一般的公營學校。現時香港的幼稚園全都是私營的。縱使教育當局透過「非牟利幼稚園租金發還計劃」和「學前教育學券計劃」向非牟利幼稚園提供資助，幼稚園可以在不違反教育局的規定下(例如教師和學生的比例依照1比15、任職的教師起碼須具備幼稚園教育證書/文憑程度的學歷等)(教育局，2013c)，自行決定教師的數目和類別(如持幼兒教育學士學歷和持幼兒教育證書/文憑學歷教師的人數)、以及教師的薪酬。倘若要把幼稚園教育變成為免費教育，教育當局為幼稚園制定一個共同的教師編制以及與公務員薪級表掛鉤的共同薪酬機制的話，儼然是在發展一個公營的幼稚園教育體制。因為縱使有關的幼稚園並不是由政府所擁有，卻是由公帑營運，而且遵循政府教育當局所制定的共同營運標準。兩所規模相若的幼稚園將會從政府取得相若的撥款、聘請數目相若的教師、為兒童提供相若的教育服務。

政府提供公營學校教育的一個十分重要的考慮，是為學生改善教育機會的公平性，讓學生不會因家長的社經匱乏(socioeconomic deficiency)而失去接受教育的機會。然而，不同的學生存在着先天和後天的差別(如能力、興趣以至家庭背景)時，給予學生平等的對待很有可能在他們之間制造了不公平(Brimley, Verstegen and Garfield, 2012)。假若對一般的兒童和有特殊教育需要的兒童都給予相同的對待的話，那麼，給予有特殊教育需要的兒童的對待便顯得並不足夠了。當然這是在整體教育機會公平性提升後所仍未解決的不公平。香港

的資助中、小學教育，在差不多相同的教學人員編制、校舍設備和撥款下，各學校為學生所提供的教育因此而趨於單一化；這對不同能力或有特殊教育需要的學生來說是不公平的。倘若把幼稚園教育發展成一個類似資助中、小學的公營教育體系的話，很可能的結果便是減低了幼稚園教育的多元性，使幼稚園教育市場趨於單一化。市場單一化降低了不同供應者所提供服務之間的差別（differentiation）；因此，也降低了這市場的活力。面對香港公營中、小學教育市場的單一化和欠缺活力等問題，香港政府根據教育統籌委員會第三號報告書的建議，於一九九一年起在中、小學推行直接資助計劃（以下簡稱直資計劃）。目的是要協助私立學校發展成為一個強大的體系，為中、小學教育注入活力，在官津學校教育以外提供另類的學校，讓家長為兒女選擇學校時有更多的選擇（教育局，2013d；Lau, 2005）。

在「直資計劃」下，撥付直資學校的津貼包括學校營運的一切經常費用、某個限額以內的日常維修費用以及更換家具和設備的費用。每名學生每年的直資單位津貼額是根據一個資助學額的平均單位成本計算的（教育署，2001），以二零一二/一三學年為例，創校16年以下的中一至中三學生的津貼額為每年40,769港元（教育局，2013e）。直資學校除了獲得與資助學校相若的每名學生津貼外，更可向學生收取學費。而且學校可以隨意運用所得的津貼作教育用途。此外，直資學校的課程可以不受教育當局有關指引的約束（教統會，1988）。由於直資學校可以隨意運用所得的津貼作教育用途，因此毋須依據資助學校的教職員編制和薪級表。因此直資計劃可以說是既具公營教育性質、卻又帶著私營學校自由市場特色的教育體系。直資計劃背後的理念其實就是管理主義^[4]（managerialism）和市場化（marketization）。藉著減少政府的參與、透過市場的力量增加學校的多元性和選擇性，從而促進學校之間競爭以達致教育質素的提升（Tse, 2005）。

資助幼稚園教育的出路

究竟香港的幼稚園教育的籌資方式可以作出怎樣的改變，從而既可以提升幼兒教育的公平性，讓所有兒童不會因為家庭經濟狀況而喪失接受高質素幼稚園教育的機會；而另一方面又不致嚴重地削弱市場力量對教育發展的正面影響？上文已論及採納現行資助中、小學的資助方式來資助幼稚園教育所須考慮的問題。這些問題都難以在短時間內讓各個持份者進行充分的討論，也難以在短時間內得出充分的共識。社會人士提出十五年免費教育的訴求，其原意是着眼於減輕家長在其子女幼稚園教育方面的財政負擔，以及確保所有兒童不會因家庭財政困難而不能接受學前教育。我們假若首先把討論的焦點放在減輕家長的財政負擔上，要推行資助的幼稚園教育便會較為容易了。至於如何設置教師薪酬機制、以至教師編制等問題，則可從詳計議。

幼稚園教育「直資化」

由於香港的幼稚園全都是私營機構，它們本已存在着相當程度的自由市場特徵。那麼是否可以採取直資中、小學的方式來推行免費幼稚園教育呢？在現時香港的中、小學的「直接資助計劃」下，政府所給予學校的撥款是以資助學校的教職員編制和標準設施為參考的，也沒有計算校舍的租金或使用校舍的機會成本。換言之，要把幼稚園教育「直資化」，當局也得設計一個計算撥款的基礎；屆時將不可避免的要制定幼稚園的教職員編制和薪級表、校舍設施的標準、以及面對校舍的租金或使用校舍的機會成本問題。然而，這些問題都是難以在短時間內得以解決的。況且，在現時中、小學的「直接資助計劃」下，直資學校是可以向家長徵收學費的；所收取的學費有高達每年六萬港元。假若幼稚園可以在政府資助以外收取學費，豈不是有違免費學前教育的原意！

[4] 管理主義是一種管理企業的思維，著重減少政府干預、重視競爭和操控、策略管理和經濟理性（Tse, 2005）。



強化「學前教育學券計劃」

強化現有的「學前教育學券計劃」，提升學券的金額，使家長獲得更多的資助。這是一個在現行情況下最簡單的方法。當初佛利民（Milton Friedman）提出學券（school voucher 或 education voucher）的構思，是源於公營學校的效能比不上私營學校。學生/家長獲發學券以作為支付學費，學生入讀的學校可把所得的學券向政府兌現，從而獲取經費（Friedman, 1955; 1962）。學校為了爭取經費，就須爭取學生；於是便不得不設法提升其教育質素。學券是把市場機制引進到公營學校教育的手段，讓學生/家長行使他們的選擇學校權，透過競爭提升學校的活力，促進學校教育的改善。因此學券的構思，可以說是在公營學校教育中，加入了私營機構自由市場機制運作的元素（Friedman, 1962; Levin, 1987）。

不過，香港的幼稚園教育在二零零七/零八學年實施學券計劃時的情況，跟佛利民的構思是有點不同的。因為在實施學券計劃前，即使非牟利幼稚園透過「非牟利幼稚園租金發還計劃」獲得政府在租金上的資助，但它們的經費主要是來自學費，它們的運作是按著自由市場機制的。幼稚園若不能夠錄取足夠的學生，最終的結果就是倒閉。不過，在基本上屬於私營的香港幼稚園教育中實施學券計劃，其實是有可能是干擾了香港幼稚園教育的市場機制。因為學券計劃的資助並不是局限於那些無力支持其子女接受幼稚園教育的家長，而是給予所有家長，只要是為他們的子女選擇參與計劃的非牟利幼稚園，便可享有學券的資助。對部分本來已有足夠財政能力支持其子女接受幼稚園教育的家長來說，在實施學券計劃後，他們可能會考慮替其子女轉讀他們認為較佳但收費較高的學校（Chan, 2011）。另一方面，學券計劃為學費設定門檻，這樣可能使部份學費已達設定門檻的幼稚園不能增加學費，以應付本身的需要

（學前教育學券計劃檢討工作小組，2010）。由此，在二零一一/一二學年結束時，已有部分幼稚園表明退出學券計劃（成報，2011）。

雖然學券計劃存在著一些問題，畢竟，學券計劃的確在某程度上減輕了家長在其子女的學前教育方面的負擔。故此，假若教育當局能夠提升學券的金額以及學費門檻的話，將會有更多家長能夠減輕子女幼稚園教育的負擔，甚至毋須繳付學費。

津貼和稅項補貼及扣減

上述兩種做法都是從向幼稚園給予資助的角度來考慮問題的。另一個可以較快地減輕家長對其子女幼稚園教育負擔的方法，是從社會保障和稅務寬減的角度出發。稅項補貼及扣減（tax credit）是一種間接地運用公帑支持非公營學校教育的方式（Brimley, Verstegen & Garfield, 2012）。在香港幼稚園方面，做法是對低收入階層子女入讀幼稚園提供津貼、以及對入讀幼稚園的學費支出作出稅務補貼及扣減。從社會保障的角度來說，低收入的家庭可受惠於社會綜合保障援助計劃^[5]（以下簡稱綜援）的教育津貼，因此加強綜援計劃中教育方面的援助，可以確保低收入家庭不致因經濟困難而把子女摒於優質學前教育門外。稅項補貼及扣減則可使較有經濟能力的家長減低了子女入讀幼稚園的財政負擔。不同的稅務扣減方式，將會在不同程度上減低子女入讀幼稚園的負擔。例如採取現時在填報薪俸稅表時，把進修支出視作為免稅額；把幼稚園學費視作為像子女免稅額般扣減應課稅入息。最慷慨的做法，便是把幼稚園學費從父母的應繳薪俸稅中予以完全扣減。至於實際上該怎樣做，則視乎政府在學前教育方面所作的公共財政的承擔究竟有多大了。這個做法對那些收入不太低、不落入稅網卻有子女入讀幼稚園的家庭來說是不能由此而獲益的。因為他們既不受惠於社會綜合保障援助計劃，

[5] 社會綜合保障援助計劃（Comprehensive Social Security Assistance Scheme 簡稱綜援）。接受綜援家庭可向社會福利署發放子女的幼稚園學費。

也未能受惠於稅務寬減。對於這類家庭，政府可以考慮採取「負所得稅」(negative income tax)^[6]的理念，向這類家庭補貼其子女幼稚園學費的開支，給他們回撥某個金額的款項。

由於每一個在職人士都須要呈報薪俸稅，故此不論稅務扣減和幼稚園學費補貼的做法都不會為政府帶來龐大的額外行政支出或交易成本的。家長只須在填報薪俸稅表的時候，好像填報認可捐款、進修開支一般，向稅務局填報其子女幼稚園學費的開支。稅務局的評稅主任在評定其應繳入息課稅時，只是多計算一個項目而已，並不會為處理這項資料而帶來很大的行政工作。然而，卻可為有需要的家長帶來實質的幫助，減輕他們在其子女幼稚園教育方面的財政壓力。另一方面，政府並沒有直接介入

幼稚園教育的市場。

結語

增加給予低收入階層對子女入讀幼稚園的津貼和實施稅項補貼及扣減，其好處是既能確保沒有兒童因其家庭經濟困難而不能接受學前教育，也能減輕家長在其子女學前教育的財政負擔。此外，由於政府並沒有直接介入幼稚園教育的市場，因此減低了學前教育趨於單一化和政府過度參與所衍生的問題。最重要的是，可以在未能徹底處理幼稚園教師編制、薪酬機制和校舍的機會成本等問題前，能夠比較迅速地確保所有兒童不會因家庭財政困難而不能接受良好的學前教育；同時也能減輕家長在子女幼稚園教育的財政壓力。

[6] 負所得稅是佛利民在一九六二年所提出的。政府對低收入人士按照其實際收入和維持一定生活水平的收入之間的差額，按某一百分比作補貼，以改善低收入人士的可用所得 (disposable income) (Frank & Bernanke, 2011)

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Corrigendum

The word “Calgary” which appeared in the article “*Is Suffering Worthwhile? Rethinking the Meaning of Job’s Sufferings from the Philosophical and Christian Religious Faith Perspective*” in the last edition should read “Calvary”. The author apologises for any confusion caused.



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本學報的辦刊宗旨是為香港幼教同仁提供一個分享知識和經驗的園地，以及辯論不同議題的平台；為實踐優質幼兒教育作出貢獻；及讓幼教研究成果和創新實踐經驗得以發表。學報可透過專題形式刊出，故編委會歡迎各界人士就專題項目提供意見。

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《香港幼兒學報》是為香港幼兒教育工作者而設的專題刊物，每年出版兩冊。本刊專為業內同仁，特別是對幼兒教育、照顧及發展感興趣的人士，提供一個專業討論的平台。編委會歡迎各界人士提供稿件，來稿請參照以下規則。

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